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SESSIONAL PAPERS

VOLUME XXXIX.—PART II.

Third Session of Eleventh Legislature

OF THE

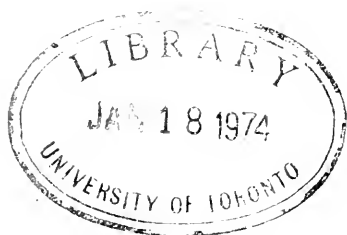
PROVINCE OF ONTARIO

SESSION 1907

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TORONTO :

Printed and Published by L. K. CAMERON, Printer to the King's Most Excellent Majesty
1907.



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TORONTO.

LIST OF SESSIONAL PAPERS.

ARRANGED ALPHABETICALLY.

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Accounts, Public.....	1	<i>Printed.</i>
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Agricultural Societies, Report.....	26	"
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Connec Clauses, Report on	62	<i>Not printed.</i>
Dairymen's Association, Report.....	21	<i>Printed.</i>
Davis Estate, correspondence.....	64	<i>Not printed.</i>
Division Courts, Report.....	37	<i>Printed.</i>
Education, Report	12	<i>Printed.</i>
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Elections, Returns.....	46	<i>Printed.</i>
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Essex Magistrates and Justices	54	<i>Not printed.</i>
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- No. 1. . Public Accounts of the Province for the year 1906. Presented to the Legislature, February 26th, 1907. *Printed.*
- No. 2. . Estimates for the service of the Province until the Estimates of the year are finally passed. Presented to the Legislature 25th January, 1907. *Not printed.* Estimates for the service of the Province, until the Estimates for the year are finally passed. Presented to the Legislature 14th February, 1907. *Not printed.* Estimates for the year 1907. Presented to the Legislature, 26th February, 1907. *Printed.* Estimates (Supplementary), for the year 1907. Presented to the Legislature, 9th April, 1907. *Printed.* Estimates (Supplementary), for the year 1907. Presented to the Legislature, 15th April, 1907. *Printed.*
- No. 3. . Report of the Minister of Lands, Forests and Mines for the year 1906. Presented to the Legislature 14th February, 1907. *Printed.*

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- No. 4. . Report of the Bureau of Mines for the year 1906. Presented to the Legislature, 20th March, 1907. *Printed.*
- No. 5. . Report of the Commissioners of the Queen Victoria Niagara Falls Park, for the year 1906. Presented to the Legislature, 19th February, 1907. *Printed.*
- No. 6. . Report of the Minister of Public Works for the year 1906 Presented to the Legislature, 8th March, 1907. *Printed.*
- No. 7. . Report relating to the Registration of Births, Marriages and Deaths during the year 1906 Presented to the Legislature, 30th January, 1907. *Printed.*
- No. 8. . Report of the Temiskaming and Northern Ontario Railway Commission, for the year 1906. Presented to the Legislature, 15th March, 1907. *Printed.*
- No. 9. . Report of the Ontario Railway and Municipal Board, for the year 1906. Presented to the Legislature, 31st January, 1907. *Printed.*

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- No. 10. . Report of the Inspector of Insurance for the year 1906. Presented to the Legislature, 30th March, 1907. *Printed.*
- No. 11. . Loan Corporations, Statements by Building Societies, Loan and other Companies, for the year 1906. Presented to the Legislature, 7th March, 1907. *Printed.*

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- No. 12. . Report of the Minister of Education, for the year 1906, with the Statistics of 1905. Presented to the Legislature, 27th February, 1907. *Printed.*
- No. 13. . Auditors' Report to the Board of Governors University of Toronto, on Capital and Income Accounts, for the year ending 30th June, 1906. Presented to the Legislature, 30th January, 1907. *Printed.*
- No. 14. . Report of the Ontario Agricultural College and Experimental Farm, for the year 1906. Presented to the Legislature, 21st March, 1907. *Printed.*

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- No. 15. . Report of the Ontario Agricultural and Experimental Union of the Province, for the year 1906. Presented to the Legislature, 21st March, 1907. *Printed.*
- No. 16. . Report of the Fruit Growers' Associations of the Province, for the year 1906. Presented to the Legislature, 21st March, 1907. *Printed.*
- No. 17. . Report of the Fruit Experimental Stations of the Province, for the year 1906. Presented to the Legislature, 21st March, 1907. *Printed.*
- No. 18. . Report of the Vegetable Growers' Association for the year 1906. Presented to the Legislature, 21st March, 1907. *Printed.*
- No. 19. . Report of the Entomological Society, for the year 1906. Presented to the Legislature, 21st March, 1907. *Printed.*
- No. 20. . Report of the Bee-Keepers' Association of the Province, for the year 1906. Presented to the Legislature 21st March, 1907. *Printed.*
- No. 21. . Report of the Dairymen's Associations of the Province, for the year 1906. Presented to the Legislature, 21st March, 1907. *Printed.*
- No. 22. . Report of the Live Stock Associations of the Province, for the year 1906. Presented to the Legislature, 21st March, 1907. *Printed.*

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- No. 24. . Report of Women's Institutes of the Province, for the year 1906. Presented to the Legislature, 19th February, 1907. *Printed.*
- No. 25. . Report of the Farmers' Institutes of the Province, for the year 1906. Presented to the Legislature, 20th March, 1907. *Printed.*
- No. 26. . Report of Agricultural Societies of the Province (Fairs and Exhibitions), for the year 1906. Presented to the Legislature, 19th February, 1907. *Printed.*
- No. 27. . Reports of the Horticultural Societies of the Province, for the year 1906. Presented to the Legislature, 21st March, 1907. *Printed.*
- No. 28. . Report of the Bureau of Industries of the Province, for the year 1906. Presented to the Legislature, 21st March, 1907. *Printed.*
- No. 29. . Report of the Inspectors of Factories for the year 1906. Presented to the Legislature, 21st March, 1907. *Printed.*
- No. 30. . Report of the Bureau of Labour for the year 1906. Presented to the Legislature, 11th March, 1907. *Printed.*

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- No. 32. . Report of the Ontario Game Commission, for the year 1906. Presented to the Legislature, 19th March, 1907. *Printed.*
- No. 33. . Report of the Department of Fisheries, for the year 1905. Presented to the Legislature, 8th March, 1907. *Printed.*
- No. 34. . Report upon the Archives of the Province, for the year 1906. Presented to the Legislature, 20th March, 1907. *Printed.*
- No. 35. . Report of Work relating to Neglected and Dependent Children of Ontario, for the year 1906. Presented to the Legislature, 20th March, 1907. *Printed.*

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- No. 36. . Report of the Provincial Board of Health, for the year 1906. Presented to the Legislature, 30th January, 1906. *Printed.*
- No. 37. . Report of the Inspector of Division Courts, for the year 1906. Presented to the Legislature, 20th March, 1907. *Printed.*
- No. 38. . Report of the Inspector of Legal Offices, for the year 1906. Presented to the Legislature, 22nd February, 1907. *Printed.*

- No. 39. . Report of the Inspector of Registry Offices, for the year 1906. Presented to the Legislature, 12th April, 1907. *Printed.*
- No. 40. . Report of the Secretary and Registrar of the Province, for the year 1906. Presented to the Legislature, 20th March, 1907. *Printed.*
- No. 41. . Report upon the Lunatic and Idiot Asylums of the Province, for the year ending 30th September, 1906. Presented to the Legislature, 20th March, 1907. *Printed.*
- No. 42. . Report upon the Prisons and Reformatories of the Province, for the year ending 30th September, 1906. Presented to the Legislature, 11th March, 1907. *Printed.*
- No. 43. . Report upon the Hospitals and Charities of the Province, for the year ending 30th September, 1906. Presented to the Legislature, 12th February, 1907. *Printed.*
- No. 44. . Report upon the Operation of Liquor License Acts, for the year 1906. Presented to the Legislature, 20th March, 1907. *Printed.*

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- No. 45. . Report of the Provincial Municipal Auditor, for the year 1906. Presented to the Legislature, 1st February, 1907. *Printed.*
- No. 46. . Supplementary Return from the Record of the several Elections in the Electoral Divisions of Cardwell, Hamilton East, West Middlesex and Carleton, since the General Elections on January 25th, 1905, shewing: (1) The number of Votes Polled for each Candidate in the Electoral District in which there was a contest; (2) The majority whereby each successful Candidate was returned; (3) The total number of votes polled in each District; (4) The number of votes remaining unpolled; (5) The number of names on the Voters' Lists in each District; (6) The population of each District as shewn by the last Census. Presented to the Legislature, 24th January and 12th April, 1907. *Printed.*
- No. 47. . Report upon the state of the Library. Presented to the Legislature, 2nd January, 1907. *Not printed.*
- No. 48. . Report of the Hydro-Electric Power Commission of the Province, for the year 1906. Presented to the Legislature, 12th April 1907. *Printed.*
- No. 49. . Report, with the evidence, of the Text-book Commission. Presented to the Legislature, 1st February, 1907. *Printed.*
- No. 50. . Copies of Orders-in-Council, under section 27, of the Act respecting the Department of Education. Presented to the Legislature, 11th February, 1907. *Not printed.*

- No. 51. . Return to an Order of the House of the sixteenth day of March, 1906, for a Return shewing the names of all License Inspectors appointed since the first day of February, 1905, together with their addresses and the dates of their appointment; the business or occupation of each Inspector prior to his appointment and the present occupation or business, other than their official business, of each such Inspector. Presented to the Legislature, 11th February, 1907. Mr. *McMillan*. *Not printed*.
- No. 52. . Return to an Order of the House, of the thirtieth day of January 1907, for a Return giving the following information regarding the Toronto Electric Light Company, Limited. 1. Date of incorporation. 2. Applicants for Incorporation 3. Objects of the Company. 4. Names of the Provisional Directors. 5. Amount of Capital. 6. Increase of Capital Stock. 7. Names of the Directors and Shareholders of the Company, according to the last Return to the Government. Presented to the Legislature, 11th February, 1907. Mr. *Hoyle*. *Not printed*.
- No. 53. . Return to an Order of the House of the nineteenth day of February, 1907, for a Return of copies of all correspondence between the Government, or any member or official thereof, and any other person or persons, with reference to the dismissal of James Gillespie, of Picton, from the office of Sheriff of the County of Prince Edward. Presented to the Legislature, 26th February, 1907, Mr. *Currie*. *Not printed*.
- No. 54. . Return to an Order of the House of the seventh day of February, 1907, for a Return shewing:—(1) List of names of Police Magistrates and Justices of the Peace in and for the County of Essex, on the 31st January, 1905. (2) List of names of Police Magistrates and Justices of the Peace in and for the County of Essex, appointed since February 1st, 1905. (3) Names of those who have qualified as Police Magistrates, or Justices of the Peace, in the County of Essex. Presented to the Legislature, 27th February, 1907. Mr. *Auld*. *Not printed*.
- No. 55. . Return of all Fees received by the Master of Titles under Rule 77 of the Land Titles Act, for the year 1906. Presented to the Legislature, 5th March, 1907. *Not printed*.
- No. 56. . Copies of Orders-in-Council commuting the Fees payable to His Honour Judge Finkle and increasing the commutations paid to His Honour Judge Benson, His Honour Judge McDonald, His Honour Judge Hardy and His Honour Judge Snider, under Section 187 of the Judicature Act and Subsection 2 of Section 84 of the Surrogate Courts Act. Presented to the Legislature, 5th March, 1907. *Not printed*.
- No. 57. . Return to an Order of the House of the thirteenth day of February 1907, for a Return shewing the various kinds of Patents issued to Locatees on St. Joseph Island. Presented to the Legislature, 5th March, 1907. Mr. *Smith (Sault Ste. Marie)*. *Not printed*.

- No. 58. . Return to an Order of the House of the twenty-fifth day of February, 1907, for a Return shewing all Estates now unsettled upon which Succession Duty was claimed by the Treasury Department where the due date was on or before the first day of January, 1905, and the estimated amount of duty due and the reasons why unsettled. Presented to the Legislature, 7th March, 1907. Mr. Kerr. *Not printed.*
- No. 59. . Return to an Order of the House of the eighth day of March, 1907, for a Return shewing the amounts credited to the cities, towns, villages and organized townships in the Province of Ontario, from the sum received under Section 2, Subsection 5, of the Supplementary Revenue Act, 1899, as amended from time to time, and also the amount charged against each such city, town, village or organized township, respectively, for the maintenance of inmates of lunatic or other asylums in the Province under the provisions of Subsection 2, of Section 4, of Chapter 9 of the Statutes of 1906. Presented to the Legislature, 11th March, 1907. Mr. Hislop. *Not printed.*
- No. 60. . Statement shewing cash expenditure on construction of the Temiskaming and Northern Ontario Railway, as of December 31st, 1906. Presented to the Legislature, 14th March, 1907. *Printed.*
- No. 61. . Return to an Order of the House of the sixth day of March, 1907, for a Return of:—1. Copies of all correspondence between the Government, or any Member or Official thereof and any person or persons, relating to the cancellation or granting of a liquor license to the Palace Hotel, at Fort Frances. 2. Copies of all correspondence between the Government, or any Member or Official thereof and any person or persons, relating to the cancellation or granting of a liquor license to one Thomas Wilson, at Fort Frances. 3. Copies of all correspondence between the Government, or any Member or Official thereof and any person or persons, relating to the resignation or dismissal of the License Inspector or any member of the Board of License Commissioners at Fort Frances. Presented to the Legislature, 20th March, 1907. Mr. McDougall. *Not printed.*
- No. 62. . Report of the Ontario Railway and Municipal Board upon certain Bills amending the Municipal Act *in re* the Commee clauses, referred to the Board by the Standing Committee on Municipal Law, in the Session of 1906. Presented to the Legislature, 19th March, 1907. *Not printed.*
- No. 63. . Report upon the Feeble-minded in Ontario. Presented to the Legislature, 15th April, 1907. *Printed.*
- No. 64. . Return to an Order of the House of the eighth day of March, 1907, for a Return of copies of all correspondence and papers relating to or in the matter of the protest of Mr. Chisholm Livingstone and the Davis Estate, against the purchase price awarded them by the arbitrators for their property for the Queen Victoria Niagara Falls Park. Presented to the Legislature, 20th March, 1907. Mr. Fraser. *Not printed.*

- No. 65. . Report upon the Horse Industry of Ontario, for the year 1906. Presented to the Legislature, 21st March, 1907. *Printed.*
- No. 66. . Return to an Order of the House, of the first day of March, 1907, for a Return shewing the number of Mining Companies incorporated in the year 1906, also total amount paid into the Treasury Department from incorporation of Mining Companies in 1906, including licenses to companies previously incorporated. Presented to the Legislature, 21st March, 1907. *Mr. Pearce. Not printed.*
- No. 67. . Return to an Order of the House, of the twenty-seventh day of February, 1906, for a Return shewing, according to Counties—
1. How many persons held Commissions and were qualified as Justices of the Peace, within the Province, on the 7th day of February, 1905. 2. How many persons held Commissions on the 7th day of February, 1906. 3. How many persons were included in the General Commission of the Peace, issued by the present Government. 4. How many of the persons named in such General Commission were continued in office from previous Commissions. Presented to the Legislature, 21st March, 1907. *Mr. Ross. Not printed.*
- No. 68. . Return to an Order of the House, of the seventh day of February, 1907, for a Return shewing:—1. The names of Counties which have adopted the "Alternative Method" of selecting Jurors under the Amendment of 1902 to the Jurors' Act. 2. For a Comparative Statement shewing the expenses incurred under the old and new system in said Counties from the years 1902 to 1906, both inclusive. 3. The Counties (if any) in which the "Alternative Method" has been repealed and have returned to the old system of selecting Jurors. Presented to the Legislature, 22nd March, 1907. *Mr. Hoyle. Not printed.*
- No. 69. . Return to an Order of the House, of the sixth day of March, 1907, for a Return of copies of all correspondence between the Government and the Northumberland-Durham Power Company, with respect to a lease of water power at Healey Falls. Presented to the Legislature, 3rd April, 1907. *Mr. Pense. Not printed.*
- No. 70. . Return to an Order of the House, of the seventh day of February, 1907, for a Return, shewing the number and names of the settlers located in the Township of Gaudette and Hodgins in the District of Algoma, since the year 1906. Presented to the Legislature, 5th April, 1907. *Mr. Smith (Sault Ste. Marie). Not printed.*
- No. 71. . Documents and correspondence regarding Petawawa Camp. Presented to the Legislature, 15th April, 1907. *Printed.*
- No. 72. . Statement of distribution of Revised and Sessional Statutes. Presented to the Legislature, 17th April, 1907. *Not printed.*

- No. 73. . Copy of a letter from His Honour A Constantineau, Judge of the Counties of Prescott and Russell, addressed to the Attorney-General of Ontario in the matter of the case *Chatillon vs. Bertrand*. Presented to the Legislature, 18th April, 1907. *Not printed.*
- No. 74. . Return to an Order of the House of the twenty-second day of March, 1907, for a return of copies of all correspondence between the Nipissing Mines Company, or any Official thereof and the Government, or any Member thereof, relating to the property, or title thereto, of the said company, or any part or or parcel thereof, situated in the Cobalt District; or to any application relating to the same; its title, or to the operation of the mines of the company, made by or on behalf of the company, or any of its Directors or Officers. Presented to the Legislature, 18th April, 1907. Mr. *McMillan*, *Not printed.*
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SIXTEENTH ANNUAL REPORT

OF THE

BUREAU OF MINES, 1907.

VOL. XVI.

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1907

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MAP

Geological sketch map. Larder Lake region, scale one mile to one inch, to accompany report of R. W. Brock.

LETTER OF TRANSMISSION

TO HIS HONOR WILLIAM MORTIMER CLARK, &C., &C., &C.,
Lieutenant-Governor of the Province of Ontario.

SIR,—I have the honor to transmit herewith for presentation to the Legislative Assembly the Sixteenth Annual Report of the Bureau of Mines.

I have the honor to be, Sir,

Your obedient servant,

F. COCHRANE,
Minister of Lands, Forests and Mines.

DEPARTMENT OF LANDS, FORESTS AND MINES,
TORONTO, 20th March, 1907.

INTRODUCTORY LETTER

TO THE HONORABLE FRANK COCHRANE,
Minister of Lands, Forests and Mines.

SIR,—I beg to submit herewith to be presented to His Honor the Lieutenant-Governor the Sixteenth Annual Report of the Bureau of Mines, which consists of two Parts. Part I gives a statistical review of the mining industry of the Province for the year 1906, and describes the operation and results of the means adopted by the Bureau for the promotion of the industry, namely, the Government Diamond Drills, the Provincial Assay Office, and the Summer Mining Classes. A brief statement is made covering the principal amendments to the mining laws made by the Mines Act, 1906, and the boundaries are given in detail of the several Mining Divisions which have been established under that Act. Part I also contains the report of Mr. E. T. Corkill, Inspector of Mines, on the Mines of Ontario, and the following articles; two on the Iron Ranges East of Lake Nipigon, by Dr. A. P. Coleman and Mr. E. S. Moore respectively; Oil and Gas in Kent county, by Mr. C. W. Knight; Iron Pyrites in Ontario, by Mr. E. L. Fraleck; and the Larder Lake District, by Mr. R. W. Brock. All of these articles are the outcome of personal investigation on the ground by their writers, and will, it is believed, be found of interest and value.

Part II consists of the Report of Prof. W. G. Miller, Provincial Geologist, on the Cobalt silver area, first published as Part II of the Fourteenth Report, and now enlarged and revised to date. Accompanying this Report is a geological map of the Cobalt district on a scale of 400 feet to an inch, on which are shown the various working mines and prospects in the silver-cobalt field.

The present Report is the first since the changes in the status of the Bureau of Mines made by the Mines Act, 1906. The Bureau, instead of as formerly being an annex of the Department of Lands, Forests and Mines, is now an integral portion of the Department, and is brought more directly under the supervision of the Minister, the head of the Bureau being termed the Deputy Minister of Mines, instead of Director of the Bureau of Mines. These changes, being largely administrative in their nature, do not affect the functions of the Bureau or alter the scope of its operations, and this being the case, it has been thought inadvisable to make any change in the numbering or title of the Annual Report, or to make any break in the continuity of the series, which might possibly have the effect of introducing confusion.

I have the honor to be, Sir,

Your obedient servant,

THOS. W. GIBSON,

Deputy Minister

OFFICE OF THE BUREAU OF MINES,
TORONTO, 20th March, 1907.

REPORT OF THE BUREAU OF MINES 1907

Vol. XVI.

Part 1.

Statistical Review

By THOS. W. GIBSON, Deputy Minister of Mines

The output of the mines and mineral works of Ontario for the calendar year 1906 had a total value of \$22,388,383, computed at the selling prices of the products at the mines or works, and not taking into account the additional values induced by subsequent refining or treatment. Compared with the production of 1905, up to that time considerably the largest on record, the yield for 1906 shows an increase of \$4,534,087, or about 25 per cent. In view of the large step in advance taken in 1905, this result cannot be considered as other than satisfactory. A period of expansion has set in in the mining industry of the Province, and it may confidently be expected that still higher figures, both as to quantities and values, will be reached in the near future. The larger aggregate of value for 1906, as compared with that for 1905 is partly due to an increase in prices, which is somewhat general throughout the list of products, and in some cases quite marked in character; but for the greater part the excess is due to increased production, especially in the metallic schedule.

Following is a summary table of the production, showing also the number of employees and the wages paid for labor:

Table I.—Mineral Production, 1906

Product.	Quantity.	Value.	Employees.	Wages.
Metallic:		\$		\$
Gold..... ounces	3,926	66,193	244	152,011
Silver..... " "	5,433,984	3,689,286	1,057	681,253
Cobalt..... tons	321	80,704		
Nickel..... " "	10,936	3,839,419		
Copper..... " "	6,032	960,813	1,632	1,246,793
Platinum metals..... ounces	314	5,052		
Lead..... tons	1,100	93,500	50	17,000
Iron ore..... " "	128,049	301,032	204	125,391
Pig iron..... " "	278,558	4,554,247	1,065 (a)	576,206 (a)
Zinc ore..... " "	400	6,000	16	12,000
		13,596,816	4,298	2,710,654
Less value Ontario iron ore (101,569 tons) smelted into pig iron.....		243,766		
Net metallic production.....		13,353,050	4,298	2,710,654
Non-metallic:			(b)	(b)
Arsenic..... tons	1,440	15,858		
Brick, common..... No.	300,000,000	2,157,000	3,342	1,050,055
File, drain..... " "	17,700,000	252,500		
Brick, pressed..... " "	39,800,000	337,795	358	133,604
" paving..... " "	3,000,000	45,000		
Building and crushed stone.....		660,000	1,200	480,000
Calcium carbide..... tons	2,626	162,780	80	38,981
Cement, Portland..... bbl.	1,598,815	2,381,014	1,035	562,085
" natural rock..... " "	8,453	6,000	27	2,694
Corundum..... tons	2,914	292,448	235	160,354
Feldspar..... " "	20,773	43,849	89	40,807
Graphite..... " "	1,772	15,000	41	12,000
Gypsum..... " "	3,265	6,405	17	3,234

(a) Includes steel making. (b) Included in silver and cobalt.

Table I.—Continued.

Product.	Quantity.	Value.	Employees.	Wages.
		\$		\$
Iron pyrites..... tons	11,090	40,583	128	57,580
Lime..... bush.	2,885,000	496,785	450	151,000
Mica..... tons	355	69,041	147	48,221
Natural gas.....		533,416	108	64,968
Peat fuel..... tons	300	900	5	900
Petroleum..... imp. gal.	19,928,322	761,546 (c)	496 (d)	308,986 (d)
Pottery.....		65,000	60	17,000
Quartz..... tons	48,376	65,765	56	38,930
Salt.....	50,414	397,738	151	69,153
sewer pipe.....		279,620	213	94,768
Sodalite..... cu. feet	200	6,000	6	1,000
Talc..... tons	1,235	3,030	9	1,300
Non-metallic production.....		9,035,303	8,253	3,337,674
Add net metallic.....		13,553,080	4,298	2,710,654
Total.....		22,588,383	12,551	6,048,328
Totals for 1905.....		17,854,296	11,151	5,082,653

(c) Value crude, not including Dominion Government bounty. (d) In petroleum refining works.

Comparing the foregoing table with the one given in last year's Report, the principal changes are seen to be in respect of the following items:

Product.	1905	1906	Change
	\$	\$	\$
Metallic:			
Silver.....	1,372,877	3,689,286	1. 2,316,409
Nickel.....	3,354,934	3,839,419	1. 484,485
Copper.....	688,993	960,813	1. 271,820
Lead.....	9,000	93,500	1. 84,500
Iron Ore.....	227,909	201,032	1. 78,123
Pig Iron.....	3,909,527	4,551,247	1. 641,720
Non-metallic:			
Brick, common.....	1,937,500	2,157,000	1. 219,500
Brick, pressed.....	231,000	337,795	1. 106,795
Cement, Portland.....	1,783,451	2,381,014	1. 597,563
Corundum.....	152,461	262,448	1. 109,987
Natural Gas.....	316,476	533,416	1. 216,940
Petroleum.....	898,545	761,546	D. 136,999

The causes leading to the above and other minor changes in value will be touched upon under appropriate headings in the subsequent pages.

It was pointed out in last year's Report¹ that the method of computing values was a highly important feature in the compilation of statistics, and that in this respect the mineral industries of Ontario had suffered in comparison with those of some of the other Provinces of the Dominion, by reason of the widely different bases adopted in valuing the mineral products. In presenting the statistics of this Province from year to year, the products have been appraised at the prices placed upon them for selling purposes at the point of production, be this mine, quarry, well or furnace; while in the case of some of the other Provinces the valuation was at the prices for which the metals or other substances would sell in some recognized market in the refined or finished form. Take an example. The copper contained in the nickel-cobalt mattes produced in the Sudbury district are valued in Table I of this Report at a trifle under 8 cents per pound, while in the Report of the Minister of Mines for British Columbia for 1905, when copper was worth much less than in 1906, the metal in the ore and matte, etc., is valued at 15.5 cents per pound, and in the "Mineral Production of Canada, 1906," issued by the Geological Survey of Canada, it is reckoned as being worth 19.278 cents per pound.

¹ Rep. Bur. Min., Vol. XV, Part I, p. 2.

At the latter figure the copper raised in this Province last year was worth \$2,325,698, instead of \$960,813, as shown in Table 1. The same is true of nickel. The yield of this metal produced in Ontario is valued in the present Report at \$3,839,419, or at the rate of 17.5 cents per pound; practically the same quantity is given by the Geological Survey Department, but it is valued at \$8,948,834, or 41.64 cents per pound.

There are arguments both for and against both systems of valuation, and those in favor of the one employed by the Bureau of Mines have seemed conclusive. But it is apparent that comparisons founded on premises so divergent are likely to be misleading, and in order that no injustice may be done the mineral industries of Ontario, the figures presented in Table 1 have been recast according to the method employed by the Mines Department of British Columbia and the Geological Survey of Canada. (See Table 1b). It is much to be desired that some common system of statistics should be adopted by the Governments of the Dominion and the various Provinces, since official schedules dealing with the same kind of facts, in manner so diverse, cannot but be confusing.

Table II.—Mineral Production 1906; Value Refined Products

Product.	Quantity	Price	Value
Metallic:			\$
Gold..... oz.	3,926	\$16.86 per oz.	66,193
Silver..... " "	5,433,984	67.892 cts. per oz.	3,699,286
Cobalt..... tons	321	\$2.25 per lb.	1,836,389
Nickel..... " "	10,936	41.64 cts. per lb.	9,107,500
Copper..... " "	6,032	19.278 " "	2,325,500
Platinum Metals..... oz.	314	\$18.00 per oz.	5,652
Lead..... tons	1,100	5.657 cts. per lb.	124,454
Iron Ore..... " "	128,049	\$2.35 per ton.	301,032
Pig Iron..... " "	275,558	\$16.49 " "	4,554,247
Steel..... " "	167,026	\$25.15 " "	4,202,278
Zinc Ore..... " "	400	\$15.00 " "	6,000
			26,218,511
Deduct value Ontario ores melted into pig iron.....			\$ 243,766
do value pig iron converted into steel.....			2,849,105
			3,092,871
			23,125,640
Non-Metallic:			
Petroleum products per Table XVI. (p. 24).....			2,506,177
Other products as per Table I.....			8,273,757
Gross production.....			\$33,905,574

While both the metallic and non-metallic schedules shared in the increased production of 1906, it will be seen that, as in 1905, the metallic list has shown proportionately the larger increase, and this, too, after excluding the item steel, which has perhaps only a doubtful claim to be included in the table. The excess of metallic production last year over that for 1905 was \$3,152,070, or an increase of 30 per cent. The output of metals and their ores for the first time exceeded that of non-metalliferous substances in 1905: in 1906 the former was to the latter as 1.5 is to 1. For the reason that the non-metallic list comprises many materials whose production, though capable of almost indefinite expansion, is yet strictly dependent upon the domestic demand, such as brick, stone, lime, salt, etc., while the metals are largely exported, the prospect is that the metal-producing branches of the industry will continue to grow more rapidly than those concerned with the non-metalliferous substances. It would be a mistake, however, to suppose that the latter are not making substantial progress. As a matter of fact, the aggregate value of the non-metallic products in 1906 was \$1,382,017 greater than in 1905, an advance of 18 per cent. The only falling off of any moment shown on either list was in the case of crude petroleum, which was lower in value in 1906 than in 1905 by \$136,999.

Table III covers a period of five years and shows the value of the various mineral products in each year both metallic and non-metallic. The increase during the term covered by the Table was 67 per cent.

Table III.—Mineral Production, 1902 to 1906

Product.	1902	1903	1904	1905	1906
Metallic:					
Gold.....	\$ 299,828	\$ 188,036	\$ 40,000	\$ 99,885	\$ 66,193
Silver.....	58,000	8,949	117,887	1,372,877	3,689,286
Platinum.....			10,452	28,116	5,652
Palladium.....			18,564		
Cobalt.....			36,620	100,000	80,704
Copper.....	680,285	716,726	297,126	688,993	960,813
Nickel.....	2,210,961	2,499,068	1,516,747	3,351,931	3,839,419
Iron Ore.....	518,445	450,069	108,008	227,909	301,032
Pig Iron.....	1,683,051	1,491,096	1,811,664	3,909,527	4,554,247
Steel.....	1,610,031	394,580	1,188,349	3,321,881	
Lead.....		1,500	11,060		
Pig Lead.....		1,275	2,500	9,000	93,500
Molybdenite.....	400	1,275			
Zinc Ore.....	11,500	17,000	3,700		6,000
	7,002,499	5,678,929	5,321,677	13,113,125	13,596,846
Less value Ontario iron ore smelted into pig iron, and pig iron converted into steel.....	745,000	436,354	250,000	2,912,115	(a) 243,766
Net metallic production.....	6,257,499	5,242,575	4,906,677	10,201,010	13,353,080
Non-Metallic:					
Actinolite.....	6,150	1,650	192		
Arsenic.....	18,009	15,420	903	2,693	15,858
Brick, common.....	1,411,000	1,561,700	1,430,000	1,937,500	2,157,000
Brick, paving.....	42,000	45,288	55,450	54,000	45,000
Brick, pressed.....	144,171	218,550	226,750	234,000	337,795
Building and Crushed Stone.....	1,020,000	845,000	709,000	700,000	660,000
Carbide of Calcium.....	89,420	144,000	152,295	159,755	162,780
Cement, natural rock.....	50,795	69,319	65,250	10,402	6,000
Cement, Portland.....	916,221	1,182,799	1,239,971	1,783,451	2,381,014
Corundum.....	83,571	87,600	150,645	152,464	262,448
Feldspar.....	12,875	20,046	21,965	29,968	43,849
Graphite.....	17,868	29,636	4,700	9,825	15,000
Gypsum.....	19,149	7,910	10,674	4,118	6,605
Iron Pyrites.....	14,933	21,693	43,716	21,885	40,583
Lime.....	617,000	520,000	406,800	424,700	496,785
Mica.....	102,500	102,205	37,847	50,446	69,041
Natural Gas.....	199,238	196,535	253,524	316,476	533,446
Peat Fuel.....		3,300	2,400	1,200	900
Petroleum Products.....	1,431,051	1,586,674	904,437	898,545	761,546
Pottery.....	171,325	160,000	100,000	60,000	65,000
Quartz.....					65,765
Salt.....	314,620	388,697	362,621	356,783	367,738
Sewer Pipe.....	191,965	199,971	288,000	225,835	279,620
Sodalite.....					6,000
Tale.....	930	2,625	2,919	2,240	3,030
Tile, drain.....	199,000	227,000	210,000	220,000	252,500
	7,134,135	7,628,918	6,665,970	7,653,286	9,035,303
Add metallic production.....	6,257,499	5,242,575	4,906,677	10,201,010	13,353,080
Total production.....	13,391,634	12,870,593	11,572,647	17,854,296	22,388,383

(a) Iron Ore only.

Gold

The gold mines of the Province were for the most part idle and unproductive during 1906. According to the returns made to the Bureau, some 3,926 ounces of bullion were obtained from the following properties, St. Anthony Reef, Laurentian, Sultana, Shakespeare, Olympia, Rush Bay, Golden Horn and Craig; a small amount was also recovered from the Bessemer mattes made from the nickel-copper ores raised by the Canadian Copper Company. The total value of the gold production was \$66,193, a somewhat smaller yield than that for the year previous.

Gold was found in 1906 on the shores of Larder lake, which lies some distance north-east of lake Temiskaming and near the Quebec boundary line, and the many prospects who were attracted by reports of the discoveries staked out a large number of claims, mostly during the winter of 1906-07. The rock formations of the region were not well-

known in detail, but as the geologists of the Bureau were all employed in other fields, examination of the district had to be postponed until the present year. A brief sketch and geological map, the work of Mr. R. W. Brock, are given in the present volume, and it is hoped to print a fuller account and more complete map in the Seventeenth Report.

Table IV.—Gold Mining, 1902 to 1906

Schedule.	1902	1903	1904	1905	1906
Mines worked.....Number	20	19	12	13	14
Ore treated.....tons	48,544	32,347	17,510	11,791	11,791
Gold product.....ounces	13,625	10,383	5,541	3,926	3,926
Gold value.....\$	229,828	188,036	109,000	99,885	66,193
Men above ground.....Number	341	243	100	175	147
Men below ground.....Number	385	230	130	134	97
Wages paid.....\$	343,984	245,490	133,000	175,818	152,011

Silver

The discovery of the Cobalt silver camp was one of the most significant events in the story of the mining industry of Ontario. The region was not a remote one, being close to the shores of lake Temiskaming whose waters were known to the voyageurs of two centuries ago, and was in later times for years the scene of active lumbering operations, yet its mineral riches, though in many places lying actually on the surface, remained undiscovered until accidentally stumbled upon in the summer or fall of 1903.² Nothing was known of the existence of silver nearer than at the Wright mine on the Quebec side of lake Temiskaming, where the ore is argentiferous galena, a mineral not at all characteristic of the veins of Cobalt; and as for cobalt, though detected by Sterry Hunt at the Wallace mine on the shore of lake Huron fifty-five years before, it appeared to be taken for granted by mineralogists that the association of this mineral with the nickel-copper ores of Sudbury, which was speedily ascertained when the latter began to be worked, was a sufficient realization of Hunt's suggestion that other deposits might hopefully be looked for. The fact that one of the richest silver districts in America had been found, came to the general public and even to mining men, fairly familiar with conditions in Ontario, with as much surprise as if the announcement had been made of the discovery of workable diamond fields in the same locality; in the

²The first discovery seems to have been made by James H. McKinley and Ernest J. Barragh, described as "lumbermen and prospectors," who on 14th August 1903 made a joint application to the Department of Crown Lands for a location situated "about 600 feet southeasterly from the ninth mile, say between stations 54 and 64, south from New Liskeard, of the Temiskaming and Northern Ontario Railway line as now located and graded." The application was not accompanied by the required affidavit showing discovery of mineral, but this was supplied on 6th October, and gave the date of discovery as the 7th August previous, the find consisting of rock ascertained by assay to contain "a goodly percentage of free or native silver." According to the papers, McKinley and Barragh were joint discoverers. The location was surveyed by W. J. Blair, O.L.S. as J.B. 1, containing 32 acres. Subsequently, four acres of the bed of Cobalt (then known as Long) lake in front of J. B. 1, and the mining rights of the road allowance between these two parcels, containing two acres, were granted. The discovery on J. B. 1 was developed into the well-known McKinley-Barragh mine, now owned and operated by the McKinley-Barragh-Savage Mining Company.

While silver appears to have been the first mineral of value actually discovered in Cobalt, the active history of the camp begins with the finding of nicolite (kuper-nickel) on what is now the La Rose mine, perhaps the most famous of all the Cobalt deposits. Fred La Rose, a blacksmith employed in construction work on the T. & N. O. railway, then being graded, when not engaged in sharpening "steel" for the rock-men, was accustomed to poke about the rocks in the neighborhood of his smithy. In doing so he uncovered some pinkish material and a little digging disclosed samples of a heavy copper-colored mineral, which in reality was nicolite, hitherto found in Ontario only in minute quantity, and known practically in this Province to mineralogists only. La Rose applied to the Department on 29th September 1903 for a location described as being opposite station 113 on the T. & N. O. railway about 1,300 feet from Long lake at the mouth of Rock creek about one mile from the south boundary of the township of Bucke. The date of the discovery is given in the affidavit as 15th September 1903. The claim was afterwards surveyed by John Shaw O. L. S. as J. S. 14, containing 37 acres, being a 40-acre tract less the right of way of the T. & N. O. Railway which crosses the western half of the parcel almost diagonally. La Rose's affidavit (which is signed Fred "Rose") describes his discovery as of one of copper, which was not an unusual mistake under the circumstances, especially as La Rose was not a prospector, and knew nothing whatever about minerals. Neil A. King, a fire ranger on the T. & N. O. line subsequently (on 15th October 1903) filed a claim for 160 acres, being "80 acres south of lot 8 first range township of Bucke, also 80 acres south of lot 9 first range" of said township, a description which included the La Rose parcel. King dated his discovery on 16th May 1903, also describing the mineral found as "copper ore." A hotly contested dispute between La Rose and King—or their assignees—followed, which was decided in favor of La Rose. The latter and his associates had at first entirely failed to recognize the native silver which lay blackened by exposure in plates and nuggets on the surface of the vein, both in place and in the form of boulders. These were pointed out to them by Prof. Miller, Provincial Geologist, who visited and examined the veins in the early part of November 1903. Mr. Miller's reports really made known these remarkable discoveries to the public.

latter case the incredulity would perhaps not have been so great, since the idea had already been exploited that the diamonds found in the drift of some of the States southwest of the great lakes had their origin in the region south of Hudson Bay.

But the chief significance of the discovery lay in the disclosure which it made of the possibilities latent in the northern parts of the Province, and the impetus which it gave to prospecting. The formations in which the cobalt veins were found are widespread, and there appears no reason why other areas equally rich may not exist elsewhere. Naturally the immediate neighborhood of the valuable discoveries was the first to be examined for other deposits, and after the course of prospecting had given what seemed to be fairly definite bounds to the rich area of eastern Coleman and the southern fringe of Bucke, explorers began to go farther afield. Following up the Montreal river, whose noble flow makes a rarely equalled route for canoe travel, the conglomerate and diabase stretches lying on both sides were looked over, and in the fall of 1906, it was reported that good finds of native silver and cobalt ore had been made in at least two localities, one by a prospector named Thomas Saville in lot one in the fifth concession of the township of James, a short distance east of the Montreal river, and about 35 miles up the stream from the Temiskaming and Northern Ontario railway crossing at Latchford, and the other by the White brothers on Anvil lake, north of Lady Evelyn lake, through which the waters of the northern part of lake Temagami find their way to the Montreal river. The latter locality is within the limits of the Temagami Forest Reserve. Not much could be done by way of development before snow fell, or while it lay upon the ground, but during the winter Prof. W. G. Miller, the Provincial Geologist, visited the region and brought back samples of smaltite containing free silver, which were quite as rich as many from the Cobalt region and greatly resembled them. The thick mantle of snow which covered the ground effectually prevented anything like extensive geological investigations, but Mr. Miller's impression was that there was a considerable development of diabase in the Anvil lake region with areas of quartzite, conditions which probably obtained also in the township of James. The Bureau proposes to have these discoveries examined and the surrounding districts thoroughly explored as soon as the snow leaves the ground in the spring of 1907, and hopes to publish a report and geological map describing them in the Seventeenth Report. Meantime some thousands of claims have been staked out in the neighborhood of both finds, many of them doubtless of the kind which has come to be known as the "snowshoe" variety. But there is every prospect of the Montreal river region being thoroughly prospected during the season of 1907, and it is quite possible that a field or fields resembling the Cobalt one may as a result be opened up.

The producing mines of the Cobalt camp in 1906 were the following: Nipissing, LaRose, Coniagas,³ Kerr Lake (Jacobs), Drummond, Buffalo, O'Brien, University, Trethewey, Cobalt Silver Queen, Right-of-Way, McKinley-Darragh-Savage, Foster, Temiscaming and Hudson Bay and Nova Scotia. A small quantity of ore was also taken from the Violet. Outside of the Cobalt region the only sources of silver were the West End Silver Mountain mine, west of Port Arthur, operated by the Hanson Consolidated Mining and Milling Company, and the Bessemer mattes refined for the Canadian Copper Company at the Orford works, New Jersey. The total production of silver was 5,433,984 ounces, worth \$3,689,286, of which the Cobalt mines yielded 5,401,766 ounces.

The Provincial Mine

The opening up of a mine and the carrying on of mining operations on a commercial scale have not heretofore been regarded as coming within the customary scope of Governmental duties, and the Province of Ontario can certainly claim to have led the way in this respect in the Dominion of Canada, if not in North America. When the rich silver finds were made in the Cobalt region, the Department of Crown Lands refused to grant locations for mining purposes on what is generally known as the Gillies

³ Co (Cobalt) Ni (Nickel) Ag (Silver) As (Arsenic) Coniagas, a name suggested by Prof. Miller.

timber limit, a tract of country lying on both sides of the Montreal river about 100 square miles in extent, the reason being that it contained a large quantity of green pine, the owners of which were apprehensive lest fire should be introduced if prospecting and mining were permitted on the limit. The northern apex of this tract penetrated like a wedge into the township of Coleman to a short distance south of Cobalt lake, and was therefore geographically within the favorable area for the occurrence of minerals. As a matter of fact, a small portion of the extreme end of this apex had been included in a grant to one of the early applicants for mining lands, the then owner of the limit having given his consent, and on this portion a workable deposit of silver ore had been found. It was not an unnatural suggestion that the mineralized portion of the Gillies limit should be prospected and worked on government account, and in the early and excited days of the Cobalt camp, rumors were rife regarding the great riches of the



Provincial Silver Mine

Gillies limit. The Legislature approved of the proposal and granted the necessary funds. Work began in the spring of 1906 under the direction of Prof. Miller, Provincial Geologist, whose first efforts were directed towards a study of the geology and to delimiting the favorable ground. The next step was to thoroughly prospect the promising areas with the view of locating actual veins, it having speedily been found that the reports of wonderful discoveries were largely, if not altogether unfounded. Those familiar with the Cobalt camp know what prospecting there means, and particularly what is involved in testing a tract of land thickly covered with soil. Trenches have to be sunk to bed rock through many feet of clay, gravel and boulders, and every inch of bed rock uncovered must be scrutinized with care lest the narrow cracks which occasionally contain so much richness be overlooked. Intelligent and systematic search, stimulated by the offer of a bonus of \$150 per inch in width for the discovery of rich silver-bearing veins, was rewarded by the finding on 19th July 1906 of a fine seven-inch vein carrying smaltite and niccolite, accompanied by a profusion of native silver partly in sheets and nuggets, and partly disseminated in smaller particles throughout the

vein matter. The actual discoverers were Messrs. Thor Brown and G. R. McLaren, two mining students who had both had experience in prospecting, and whose reward amounted to \$1,050.

A shaft has been sunk in the country rock about 10 feet away from the vein, the work down to 75 feet being by contract, and thence to 120 feet by day labor. At 75 feet a cross-cut connects the shaft with the vein, on which a drift has been run to the northeast 110 feet and southwest 75 feet. The vein continues strong, rich and of full width as far as exposed.

A shafthouse 40 feet in height has been erected, and an ore house 20 by 20 feet built about 100 feet northwest of the shaft. In the power house, 34 by 50 feet, one 100-h.p. Jenckes return tubular boiler, the high pressure half of a B-3 Rand drill compressor capable of developing 450 cubic feet of air per minute, one 7 by 10-inch double cylinder Jenckes hoist, and one feed-water pump, have been installed. At Cart lake, which is 450 feet distant, a duplex Worthington pump has been placed for supplying water to the boiler. In the mine itself are one Cameron sinking pump, two No. 42 Rand drills, and two 2½-inch Mac drills. The camp buildings consist of office 18 by 22 feet, bunk house 20 by 50, dining room 20 by 40, and blacksmith shop 12 by 15 feet. In addition, there is sufficient pipe for carrying air into the mine and keeping the latter free from water, etc.

The vein has been stripped for about 100 feet in length. On another vein adjoining the Morrison property, west of the railway track, a shaft has been sunk 50 feet deep, at which depth some 35 feet of drifting has been done.

A spur of the T. & N. O. Railway from Cobalt to Kerr lake is under construction, which will pass close to the Provincial mine and provide good facilities for shipping.

Like many of the other mines of the district the Provincial mine was hampered and progress was rendered slow by the delays experienced in procuring machinery from the makers. Contracts given on the understanding that delivery was to be made in so many weeks were not filled until the lapse of as many months. Labor conditions, too, have been unfavorable during the summer of 1907, and it was found impracticable to run a night shift because of the proximity of the sleeping camp to the railway cuts, blasts from which on several occasions sent stones through the roofs. Doubtless, however, the mine will be in position to make shipments of ore as soon as it can be hauled out over the snow.

The following table summarizes the output of the Cobalt camp since it was opened up:

Table V.—Production of Cobalt Mines, 1904-1906

Year.	Ore shipped.		Nickel.		Cobalt.		Arsenic.		Silver.		Total value.
	Tons.		Tons.	Value.	Tons.	Value.	Tons.	Value.	Ounces.	Value.	
		\$				\$				\$	\$
1904.....	158	14	3,467	16	19,960	72	903	206,875	111,887	136,217	
1905.....	2,111	75	10,000	118	100,000	549	2,693	2,451,356	1,360,503	1,473,196	
1906.....	5,335	160	.....	321	80,704	1,440	15,858	5,401,766	3,067,551	3,764,113	
Total.....	7,607	249	13,467	455	200,664	2,061	19,454	8,059,997	5,139,941	5,373,526	

The average value of the ore shipped during the three years was \$704 per ton. For the first year, when only very rich material left the camp, the ore averaged \$862 per ton; in 1905, when a large quantity of low-grade gravel was included in the shipments, it fell to \$687 per ton; while in 1906 the average went up to \$705 per ton, practically identical with the average for the whole period. A considerable proportion

of the consignments last year was also of second or third class quality, but on the other hand there were many carloads of unusual richness. The percentage of low grade ore will in 1907 probably show an increase, but concentration plants which are now being installed at some of the mines will enable much of this grade of material to be treated in the camp. The minimum limit of ore which can be profitably shipped is about 100 ounces of silver per ton, and owing to the fact that in many of the mines free silver in films and thin sheets is found extending from the veins into the walls for a considerable distance, the quantity of concentrating rock or ore will no doubt in the aggregate prove to be large.

Table VI sets forth the course of silver mining in the Province for the last five years; in examining it the fact should be borne in mind that in 1903 the Lake Superior mines ceased work, and in 1904 those of Cobalt began. The difference between the figures for 1902-3 and for 1904-6 is sufficiently striking.

Table VI.—Silver Mining, 1902 to 1906

Schedule.	1902.	1903.	1904.	1905.	1906.
Ore raised.....tons	6,250	3,400	158	3,144	9,456
Ore stamped....."	6,250	3,300			1,500
Ore shipped....."			158	2,144	5,335
Silver product.....oz.	96,665	16,688	206,875	2,473,452	5,433,984
Value of silver.....\$	58,000	8,949	111,887	1,372,577	3,689,286
Men above ground.....No.	25	12	29	289	471
Men under "....."	25	20	28	186	586
Wages paid.....\$	36,000	8,000	12,300	191,582	581,253

It will be observed from the statistics in the foregoing tables that the cobalt, nickel and arsenic contents of the Cobalt ores are at present of very little value to the mine-owners. As a matter of fact, they are of so little importance to them that in most cases no assays are made for anything but silver, everything else being regarded as waste. The sole exception is cobalt, which in the silver-bearing ores is paid for if in excess of 6 per cent.; in non-silver ores, of which there are some veins, it brings 63 cents per pound when the ore runs over 16 per cent. cobalt, lower percentages being settled for nearly in proportion. These rates are paid by manufacturers of cobalt oxide in Great Britain, who advance 75 per cent. of the value upon shipment, and settle for the balance on umpire assay in Britain. Nickel and arsenic bring practically no return to the sellers of ore, the figures of value set opposite the latter being for the refined white arsenic produced at the Copper Cliff reduction works, where about 1,000 tons of ore from Cobalt were treated during the year.⁴

⁴ The principal purchasers of ore produced in the mines of Cobalt are the American Smelting and Refining Company, Perth Amboy, N.J., the Balbach Smelting and Refining Company, Newark, N.J., and the Orford Copper Company, Copper Cliff, Ont. The Anglo-French Nickel Syndicate, Swansea, Wales, are buyers of silver-free cobalt ore. Under date of 26th April, 1907, the American Smelting and Refining Company notified ore sellers that its terms for purchasing ore would thereafter be as follows:

"Silver: Pay for 94 per cent. of the silver contents at the New York quotation as given by Messrs. Handy and Harman to Western Telegraph Co. on the thirtieth day after agreement of assays.

"Working charge: On ores containing less than 300 ounces per ton, \$10 per ton of 2,000 lbs. dry weight. On ores assaying 300 ounces or over and under 1,000 ounces per ton, \$9. On ores assaying 1,000 ounces or over, and under 1,500 ounces, \$8. On ores assaying 1,500 ounces or over, \$25.

"Arsenic: Should arsenic be contained in excess of 5 per cent., an addition to the working charge will be made at the rate of 50 cents per dry ton for each per cent. of arsenic in excess of 5 per cent.

"Insoluble matter: An addition to the working charge will be made at the rate of 7 cents per dry ton for each per cent. of insoluble matter in excess of iron.

"Payments of net proceeds of shipments will be made on the thirtieth day after date of agreement of assays." Shipments of ore to be accepted by the company only under regular contract for some stated period.

The Orford Copper Company's schedule for ores purchased to be treated at the reduction works, Copper Cliff, is as follows:

Payment for 94 per cent. of silver per ton (2,000 lbs.) carrying 4,000 oz. silver and over.

93	do	do	1,200	do
92	do	do	800	do
90	do	do	500	do
85	do	do	300	do
80	do	do	150	do

\$30 per ton of ore (2,000 lbs.) containing 12 per cent. cobalt and over.

20	do	do	do	do
10	do	do	do	do

No payment for other metals than cobalt and silver, and ores containing more nickel than cobalt are not wanted.

Under such circumstances, it is impossible to obtain exact figures of the production of cobalt, nickel and arsenic, and those given in the foregoing tables are approximate. A very large number of assays of car lots of Cobalt ores have been made by Messrs. Ledoux and Company of New York, upon whose certificate practically all of the ore is bought and sold, and in an address to the Canadian Mining Institute in March, 1907, Dr. A. R. Ledoux states that 394 such assays showed the ore to contain on an average 5.99 per cent. of cobalt, 3.66 per cent. of nickel and 27.12 per cent. of arsenic.⁵ The percentages adopted for the purpose of the tables given in this Report are cobalt 6, nickel 3, arsenic 27.

Of the several plants for the treatment of Cobalt ores, one reached completion in 1906, namely the works erected by the Canadian Copper Company at Copper Cliff. Some 998 tons of ore were here treated during the year, a considerable proportion of the silver and arsenic being recovered and the remainder shipped as speiss to the International Nickel Company's works in New Jersey for further treatment. The reduction plant at North Bay put up by the Montreal Reduction and Smelting Company, Limited, was reported completed or nearly so in the spring of 1907, but has not yet been put in operation, while the works of the North American Cobalt Refining Company, Limited, in which the Peake process experimented with at Hamilton was to have been installed, have not as yet been erected at Thorold, the site fixed upon. At Deloro in Hastings county, the gold-arsenic extraction plant formerly operated by Canadian Goldfields has been acquired by the Deloro Mining and Reduction Company, Limited, which is now refitting it with machinery required for the Kirkpatrick-Kirkegaard process, with a view of treating ores from the Cobalt camp. A fourth plant is in course of construction at Sturgeon Falls by the North Ontario Reduction and Refining Company, Limited, and a fifth is projected at Cobalt itself by Mr. Henry H. Muggley and others. There is no doubt that the metallurgical process involved in the complete separation of the four valuable ingredients of the Cobalt ores, namely silver, cobalt, nickel and arsenic, presents a good many difficulties, but there is no occasion to doubt that these difficulties will yield to skill and ingenuity, and that ere long these refractory ores will be satisfactorily treated within the boundaries of the Province.

Dividend-paying Mines

That legitimate mining operations in the Cobalt field are remunerative may be seen from the table given on the next page of the dividend-paying mines. In nearly every instance too, a large first profit was reaped before the mine was sold to the company operating it. In fact, a large proportion of the money made in Cobalt has gone to the original prospectors or their immediate successors who purchased the properties and did enough work on them to show their value. A remarkable case is that of the Temiscaming and Hudson Bay Mining Company. This was a local concern organized to exploit some iron deposits before the discoveries at Cobalt were made. In the spring of 1904 after the richness of the silver veins found in the previous autumn had been made known, the company located a number of claims close to the first discoveries. On one of these was developed the Cobalt Silver Queen Mine, which was sold to the company of that name. Subsequently, on another claim—the northeast part of lot 6 concession 6 Coleman—a rich vein was exposed which the company is now working. The original paid up capital of this company, \$8,110, has been returned in dividends 92 times over, most of this being the proceeds of the sale of the Silver Queen. The shares of \$1 per value have sold up to \$190. Such successes, coupled with the fortunes made by private individuals, could not fail to have the effect of drawing marked attention to the camp.

Following is the table showing dividends paid up to 30th June, 1907:

⁵ According to Dr. Ledoux the richest carload assayed by him contained 7,402 ounces of silver per ton, the next in order 6,999 ounces per ton and the next 6,413. Several others followed closely. From another source it is learned that in 1907 one carload consignment of 18 tons averaged 7,091 ounces, and another of 12 tons 6,208 ounces.

DIVIDENDS PAID BY COBALT SILVER MINES.

Name of Company.	Date of Incorporation.	Amount of Capital Stock Authorized.	Amount of Capital Stock Issued.	Par Value of Share.	Total Dividends and Bonuses declared up to 31st December, 1906.	Dividends and bonuses declared in 1907.	When last dividend or bonus declared.	Rate of last dividend percent.	Rate of last bonus percent.
The Buffalo Mines, Limited.....	May 10, '06	\$ 1,000,000	\$ 900,000	1	\$ 27,000	\$ 81,000 00	July 10, '07	3	
The Coniagas Mines, Limited	Nov. 27, '06	4,000,000	4,000,000	5	none	200,000 00	June 17, '07	2	1
Cobalt Silver Queen, Limited.....	April 6, '07	1,500,000	1,500,000	1	none	120,000 00	Jan. 15, '07	8	
Foster Cobalt Mining Company, Limited.	Feb. 14, '06	1,000,000	900,000	1	45,000	none	Dec. 15, '06	5	
McKinley - Darragh - Savage Mines of Cobalt, Limited.....	April 17, '06	2,500,000	2,200,000	1	none	44,000 00	Jan. 21, '07	2	
The Nipissing Mining Company, Limited	Dec. 16, '04	250,000	250,000	100	950,000	400,000 00	June 20, '07	80	53½
The Right of Way Mining Company, Limited	July 13, '06	500,000	499,518	1	none	31,923 40	Mar. 5, '07	7	
Temisaming and Hudson Bay Mining Company, Limited.....	July 29, '03	25,000	8,110	1	746,120	none	Nov. 14, '06	4,500	
Trethewey Silver Cobalt Mine, Limited..	May 30, '06	1,000,000	945,450	1	37,818	37,818 00	Mar. 31, '07	4	
					\$ 81,805,938	\$ 8917,741 40			

The foregoing table does not include several companies or concerns which are practically close corporations, and whose stock or properties are owned or controlled by a few individuals in each case. Under this category fall the La Rose Mining Company, the Kerr Lake Mining Company, Drummond Mines, Limited, and the O'Brien mine. Adding the profits divided among the shareholders of these companies or owners of the mines to the total of dividends and bonuses paid out as above, the net returns from the active mines of the Cobalt camp will be found to be little if any less than four millions of dollars up to the end of the first six months of 1907.

The Cobalt Boom

A word or two was said in last year's Report as to the then impending "boom" in the stocks of Cobalt mining companies. The prediction was amply verified, but no warning would have sufficed to stem the tide of speculation which was then steadily rising. To follow the progress of a mining "boom" is to take a course in the study of psychology. News comes of a rich discovery; almost immediately the ground, good, bad or indifferent, surrounding the find is staked out as mining claims; a languid public is roused to interest by tales of sudden wealth; exaggerated reports of the richness of the district appear in the press; a host of joint stock companies is formed on lands of very doubtful value, but as near as possible to a known mine; shares in these companies are loudly advertised, and the public, whose appetite has by this time become whetted, buys readily. The supply of such stocks being inexhaustible, there is little or no chance for prices to go up, and when the disappointed purchasers come to look for profits or returns, they find, in some cases, a variety of excuses, in many nothing whatever. The really valuable properties are either not offered to the public at all, or if offered are for the most part capitalized too highly. In these for a time the speculative fever may send up the price of shares, but the height is quickly reached and a reaction sets in during which everybody wants to sell and none to buy. The stocks of non-operating companies become unsaleable, and those of legitimate concerns drop to something like their real value. The public is "shaken out" and loads with objurgations the mining industry, losing sight of the fact that the real causes of the loss were its own cupidity and the unscrupulousness of promoters.

This is the story of many mining camps in America, and this is what happened at Cobalt in 1906. In the fall of that year when speculation was at its height the withdrawal of the Guggenheims of New York from an option to purchase a heavy interest in the Nipissing mine precipitated a break in the stock market, from which it has not yet recovered. Though the losses were heavy, it is probable that the "slump" was a blessing in disguise, for had the excitement continued it would have become more general, and the loss when it came, with the consequent demoralization, would have been even more widespread. These recurring periods of excitement do much to hinder the development of mining as a business, and to discredit it in the eyes of people with money looking for safe and remunerative investments.

The map of the Cobalt mining area which accompanied Prof. Miller's Report, the second edition of which, consisting of 10,000 copies, was published last year, was again revised, and republished with some corrections and additions in the spring of 1907. A contoured map of the camp on a scale of 400 feet to an inch with the geology brought down to include the latest developments, is in course of preparation and will be published as soon as completed. It is the work of Prof. Miller and Mr. C. W. Knight, Assistant Geologist.

Nickel

The output of the nickel mines of the Province, 10,936 tons, was the largest yet recorded, being 1,433 tons in excess of the production of 1905, which was the greatest up to that time. Of this 160 tons was derived from the silver-cobalt mines of the Cobalt district, in which nickel occurs in the mineral niccolite, or nickelite, the remainder being from the nickeliferous pyrrhotite mines of Sudbury.

The producing companies in the Sudbury district are the Canadian Copper Company and the Mond Nickel Company. The former raised 219,220 tons of ore from the Creighton mine, and 70,515 tons from Copper Cliff No. 2. The ore extracted by the Mond Company came entirely from Victoria mine No. 1.

The works of both of these companies are thoroughly well equipped, and furnish excellent examples both of mining and smelting practice. The ore is first roasted in open-air heaps to expel the sulphur and then smelted into matte, which is treated in Bessemer converters and raised in metallic contents of nickel and copper to about 80 per cent. In this form it is shipped for final separation of the metals by the Canadian Copper Company to Constable Hook, New Jersey, and by the Mond Nickel Company to Clydach, Wales. The number of workmen employed in the nickel-copper mines and works in 1906 was 1,417, and the amount of money paid out in wages was the large sum of \$1,117,420. The nickel mining industry continues to play, as it has long played, a highly effective part in the development of that part of northern Ontario in which it has its seat.

Following are particulars of the nickel-copper industry for 1906 and the four preceding years:

Table VII.—Nickel-Copper Mining 1902 to 1906

Schedule.		1902.	1903.	1904.	1905.	1906.
Ore raised	tons	269,538	152,940	203,388	284,090	343,814
Ore smelted	"	233,388	220,937	102,844	257,745	340,059
Ordinary matte produced	"	24,691	30,416	19,123	.....	.....
High grade matte produced	"	13,332	14,419	6,926	(a) 17,388	(a) 20,364
Nickel contents	"	5,945	6,998	4,743	9,503	10,776
Copper contents	"	4,066	4,065	2,163	4,525	5,260
Value of Nickel	\$	2,210,961	2,499,068	1,516,747	3,354,934	3,839,419
Value of Copper	"	616,763	583,646	297,126	688,993	806,413
Wages paid	"	835,050	746,147	570,901	833,822	1,117,420
Men employed	No.	1,445	1,277	1,063	1,176	1,417

(a) Bessemer matte.

In 1906 26,741 cords of wood valued at \$61,571, were used, principally in roasting the green ore, and 59,863 tons of coke, worth \$380,732 for smelting the ore. The nickel contents of the ore smelted last year, as estimated on the quantity of Bessemer matte produced, and making no allowance for loss in roasting or smelting, were 3.16 per cent., and copper 1.54 per cent.

Table No. VII does not cover the nickel contained in the Cobalt mines. The total nickel product in 1906 is shown by the following figures:

District.	Ore.	Quantity ore. Tons.	Nickel. Tons.	Nickel contents per cent.
Sudbury	Nickel-copper	340,059	10,776	3.16
Cobalt	Nickel and cobalt arsenides and silver	5,335	160	3.00
Total		345,395	10,936	

Copper

The nickel-copper mines are still the great source of the copper produced in Ontario, but the sulphide mines of the north shore of lake Huron, which do not carry nickel, are growing in output and importance. Seven mines—the Hermina, Bruce, Superior, Dean Lake and Massey Station, north of lake Huron, the Tip-top, west of Port Arthur, and Medina or Eldorado in Hastings county—raised a total of 18,836 tons of ore, estimated to contain about 772 tons of copper, or a little over 4 per cent.

The Copper Mining and Smelting Company of Ontario, Limited, a company formed in London, England, took over the old Bruce mines property in 1905, and after unwatering the workings, which are quite extensive, began drilling with two machines in August, 1906. At the close of the year they had six at work, and intended to increase the number as they opened up new ground. The Superior Copper Company operated their mine of the same name north of Sault Ste. Marie for the whole of the year, and now propose to put in an extensive plant for concentrating the ore and also for smelting purposes. About half a mile from the village of Eldorado, in the County of Hastings, occurs a deposit of copper sulphide which was at first worked as an iron mine, the upper portion having been oxidized into hematite and the copper and sulphur leached out by atmospheric action and water. After a considerable quantity of iron ore had been removed, copper pyrites began to be encountered in increasing quantity, and diamond drill boring revealed the fact that the iron was merely a surface deposit, copper being the chief mineral of value below. A smelter has been erected at this mine.

In past Reports statistics of the non-nickeliferous or purely copper mines have been included in those of nickel-copper mines, but the figures are now sufficiently important to warrant their being presented separately:

Non-Nickeliferous Copper Mines 1906

Ore raised.....	tons	18,836
Estimated copper in do.....	"	772
Value of do.....	\$	154,400
Ore smelted.....	tons	2,660
Matte produced.....	"	117
Value of do.....	\$	24,576
Wages paid.....		129,373
Workmen employed.....	No.	215

Iron Ore

Of iron ore the output in 1906 was 128,049 tons valued at the mine at \$301,032, as compared with 211,597 tons worth \$227,909 in 1905. The bulk of the ore was hematite from the Helen mine in Michipicoten, the remainder being magnetite from the Radnor mine near Eganville, owned by the Canada Iron Furnace Company, and the Mineral Range Company's mines near L'Amable in the county of Hastings. The last named company have been developing their properties for several years past under the management of Mr. H. C. Farnum, and are now in a position to ship a considerable tonnage of ore per day, a spur line having been built to connect the mines with the Central Ontario railway. Engagements have been made to fill orders for the blast furnaces at Midland and Sault Ste. Marie, the ore being of desirable quality.

The magnetite deposits in Hutton township, north of Sudbury, have been under development for some time, and are very promising both as regards the extent and character of the ore. The branch of the Canadian Northern railway from Sudbury to Moose Mountain has been nearly completed and shipments of ore will no doubt be made during the season of 1907. In Ogelbay, Norton and Company's handbook of Lake Superior Iron Ores, Cleveland, 1907, the following analysis is given of consignments of Moose Mountain ore:

	Per cent.
Iron.....	51.06
Phosphorus.....	.097
Silica.....	12.94
Manganese.....	.019
Alumina.....	1.18
Lime.....	3.51
Magnesia.....	3.07
Sulphur.....	.010
Titanium.....	None
Moisture.....	2.60

The guarantee of metallic iron contents is given as 54 per cent., the ore being in its natural condition.

Iron ore has been found in the township of Wisner, north of Sudbury, and the deposits at Burwash lake in the Temagami Forest Reserve, east of Moose Mountain,

have been under exploration by the diamond drill. The drilling is being done by Messrs. Mackenzie and Mann.

It has long been known that the Iron formation characteristic of northern and north-western Ontario attains a considerable development in the unsurveyed territory east of lake Nepigon, and last year an examination of that region was undertaken by Dr. A. P. Coleman, assisted by Mr. E. S. Moore. The results of their labors are set forth in the present volume under the title "Iron Ranges East of Lake Nepigon." The work not having been completed, it is proposed to continue it during the field season of 1907. For the same reason it has been thought better to postpone publication of the geological map which accompanied the report of Messrs. Coleman and Moore until the field work has been more fully covered.

Table IX sets out the iron ore production of the Province during the five years beginning with 1902:

Table IX.—Iron Ore Production, 1902 to 1906

Schedule.	1902.	1903.	1904.	1905.	1906.
Ore shipped.....tons	359,288	208,154	53,253	211,597	128,049
Value of ore shipped.....\$	518,445	450,099	108,068	227,909	301,032
Men employed.....No.	388	324	191	278	204
Wages paid.....\$	228,534	166,457	81,673	164,153	125,391

Pig Iron and Steel

There were produced in the blast furnaces of Ontario during the year 1906, 275,558 tons of pig iron valued at \$4,554,247, as compared with 256,704 tons worth \$3,009,527 in 1905. The number of furnaces in operation remained the same, namely, five, situated at Hamilton, Deseronto, Midland and Sault Ste. Marie. The Province's capacity for pig iron production in undergoing enlargement, as the blast furnace at Port Arthur in which it is proposed to smelt the output of the Atik-okan mines was nearly completed at the end of the year, and early in 1907 the construction of a new furnace by the Hamilton Steel and Iron Works at Hamilton was well under way. This furnace was being erected by Frank C. Roberts and Company of Philadelphia. The measurement of the stack was 85 feet high by 22 feet 6 inches in diameter, and the new furnace will enable the company to increase its pig iron product by 110,000 gross tons per annum. It is expected to go into operation in July or August, 1907. In addition the company are erecting a fourth open-hearth steel furnace under the supervision of Alex. Laughlin and Company of Pittsburg, which when completed will nearly double their production of steel bars. The production of steel in the Province was as shown in the table below. Of the pig iron, output 49,907 net tons were used by the Hamilton Steel and Iron Company in the production of steel ingots and castings, while the whole product of the Algoma Steel Company at Sault Ste. Marie was converted into steel rails. The latter company are installing a plant for the production of open-hearth steel, their present works being for the Bessemer process.

Following are details of the operation and production of the blast furnaces and steel works in 1906:

Ontario ore smelted.....tons	101,569
Foreign "....."	396,463
Scale and mill cinder....."	24,282
Limestone for flux....."	153,702
Coke for fuel....."	304,676
Value of do.....\$	1,589,941
Charcoal for fuel.....bush.	811,926
Value of do.....\$	32,477
Pig iron product.....tons	275,558
Value of do.....\$	4,554,247
Steel product.....tons	167,026
Value of do.....\$	4,202,278
Workmen employed.....No.	1,095
Wages paid.....\$	576,206

It will be seen that of the total quantity of ore charged into the blast furnaces last year only 101,569 tons, or some 20 per cent. was of domestic origin, the remainder being imported from the United States. Several reasons have operated in favor of the use of iron ores from south of the line. One is the enormous and constant movement of ore cargoes from lake Superior ports to eastern furnaces, which enables supplies of ore of any desired kind to be easily obtained at current prices, and another is the fact that there are very few iron mines in Ontario in a position to maintain shipments of ore on any considerable scale. The former advantage can be freely availed of by Ontario furnace men because of the absence of any import duty on ore brought from the United States, Canadian fiscal arrangements being such as to impose no such obstacle to the use of foreign ores as the U. S. tariff, for instance, with its impost of 40 cents per gross ton, places on Canadian ores. The Helen mine has for years been the chief source of iron ore within the limits of the Province which could be drawn upon by blast furnaces here, but this paucity of supply is likely to disappear in large degree at an early date, with the opening up of the Moose Mountain and Mineral Range mines. It must be remembered, too, that all ores are not suitable for all purposes. Hence, although a large proportion of the Ontario ore produced which comes from the Helen mine is exported to the United States, the practical effect is that it is exchanged there for other ores better suited for the manufacture of steel rails by the Bessemer process as carried on by the Algoma Commercial Company at Sault Ste. Marie.

Particulars with regard to the operations of the pig iron and steel making industry for the last five years are as follows:

Table X.—Production Iron and Steel, 1902 to 1906

Schedule.	1902.	1903.	1904.	1905.	1906.
Ontario ore smelted.....tons	92,883	48,062	50,423	61,960	101,569
Foreign ore smelted....."	94,079	103,137	173,182	383,459	396,463
Limestone for flux....."	58,885	49,426	61,566	121,052	153,702
Coke....."	111,390	96,540	135,108	262,415	304,676
Charcoal.....bush.	968,623	932,630	1,821,270	3,387,869	811,926
Pig iron.....tons	112,687	87,004	127,845	256,704	275,558
Value of pig iron.....\$	1,683,051	1,491,696	1,811,664	3,909,527	4,554,247
Steel.....tons	68,802	15,229	51,002	138,387	167,026
Value of steel.....\$	1,610,031	304,580	1,188,349	3,321,884	4,202,278

Lead

Pig lead was produced last year to the extent of 1,100 tons, the ore being extracted from the mines of the Stanley Smelting Works and smelted at the Company's furnace at Bannockburn, Hastings county. The quantity of ore raised was 1,950 tons and the quantity smelted 1,600 tons, the pig product having a value of \$93,500. The capacity of the Stanley Smelting works is about seven tons of pig lead per day.

Zinc Ore

Some 400 tons of zinc ore were raised during the year from the Olden zinc mine in the county of Hastings, worth \$6,000.

Building Materials

That building operations were actively carried on during the past year is clear from the returns made of the production of materials used for construction purposes. The larger cities and towns have nearly all experienced a shortage of dwelling houses, and the higher scale of rentals has had the natural result of bringing about the erection of a very large number of new houses; this, too, in the face of the steadily increasing cost of building. The demand for building materials for railway construction and other public improvements has also been very considerable.

The output of common brick, according to returns to the Bureau, was 300 million worth \$2,157,000, as compared with 250 million valued at \$1,937,500 in 1905. Pressed brick rose from 26,000,000 worth \$234,000 in 1905 to 39,860,000 worth \$337,795 in 1906. The brick yards in and around Toronto have for several years had difficulty in meeting the demand, and prices in that market have increased in consequence. Taking the Province as a whole, however, there has been a slight fall in the average price of bricks as compared with 1905, the value having gone back practically to the level of 1904. The tendency to higher prices for bricks has been manifest for a series of years, as the following figures show, 1906 being the first year in which this tendency has been suspended.

Year.	Price per M.
1901	\$5 73
1902	6 41
1903	6 78
1904	7 15
1905	7 75
1906	7 19

The advancing prices have beyond doubt been due to the increasing cost of labor, fuel and plant, as the raw material is of comparatively little monetary value, and exists in enormous—it may be said, inexhaustible—quantities distributed over the whole of the Province.

Other clay products were pressed and paving brick, pottery and sewer pipe, which were made in about the usual quantity. An exception ought perhaps to be made in the case of pottery, the domestic manufacture of which does not seem to be flourishing. The causes for this lack of progress appear to be severe competition from imported goods, and the scarcity of suitable clay for the finer articles. The glacial deposits of Ontario are rarely pure enough or sufficiently uniform in composition to furnish clay of the requisite composition for any but the common varieties of pottery. There are three factories for the production of sewer pipe, namely those of the Toronto and Hamilton Sewer Pipe Company at Hamilton, the Ontario Sewer Pipe Company at Mimico, and the Dominion Sewer Pipe Company at Swansea. The first named plant was burned down in April, 1906, but new buildings were erected and the works again put in operation about the beginning of December.

The output of stone for builders' use remained at about the same level as in former years, and was supplemented by a very considerable production of crushed stone for road-making and fluxing purposes. The rapidly growing use of Portland cement which is now employed so extensively for foundations, bridges and even whole structures, has undoubtedly interfered with the development of the quarrying industry in Ontario, as well as in other places. The Province is well supplied with the raw material for this industry, and admirably situated for carrying it on to advantage, especially with our neighbours to the south, by reason of cheap water transportation. Nevertheless, it is a fact that the limestones, granites and marbles of eastern Ontario, the dolomites, sandstones and limestones of southeastern Ontario, and the traps, granites and sandstones of the north, have not yet begun to play that part in the economic life of the Province of which they are capable. In part this may be due to adverse tariffs, but perhaps also in part to other causes of a nature likely to disappear before skill, enterprise and capital.

The quantity of lime turned out by the kilns of Ontario in 1906 was 2,885,000 bushels, as against 3,100,000 bushels in 1905. Returns show a decided advance in price, the average value per bushel in 1906 being 17.2 cents, as compared with 13.7 cents in 1905.

Cement

Very few departments of the mineral industry can exhibit so remarkable a record of steady and rapid growth as the manufacture of Portland cement. Beginning in 1891, the production has increased from 2,033 barrels valued at \$5,082, to 1,598,815 barrels

in 1906 worth \$2,381,014, and the number of manufactories has risen from one to twelve. The raw materials, marl and clay, are abundant, and the demand for cement has been, and still is, very active. In consequence of this demand, the increase in production has been accompanied by an advance in price, the average cost per barrel at the factory having risen from \$1.42 in 1905 to \$1.48 in 1906. It seems in every way likely that the production and sale of cement will show a corresponding increase in 1907.

The cement plants which were in operation during 1906 were the following: Raven Lake Portland Cement Company, Raven Lake; Imperial Cement Company, Owen Sound; Belleville Portland Cement Company, Point Ann; Lakefield Portland Cement Company, Lakefield; Canadian Portland Cement Company, Marlbank; National Portland Cement Company, Durham; Grey and Bruce Portland Cement Company, Brookholm; Owen Sound Portland Cement Company, Shallow Lake; Ontario Portland Cement Company, Blue Lake; Sun Portland Cement Company, Owen Sound; Western Ontario Portland Cement Company, Atwood; Hanover Portland Cement Company, Hanover. Two plants, those of the Colonial Portland Cement Company, Wiarton, and the Superior Portland Cement Company, Orangeville, had not been completed at the close of the year.

Nearly all of the Portland cement manufactories hitherto established in Ontario have made use of marl as one of the ingredients, but there is a tendency towards substitution of solid limestone, where this can be obtained of suitable composition, as it is believed the cost of production can in this way be lessened. The limestone beds at Point Ann on the Bay of Quinte are utilized by the Belleville Portland Cement Company, but all the other plants in the list given above use marl.

The manufacture of natural rock cement, on the other hand, has exhibited a decidedly downward tendency of late years, and from the returns of 1906 appears to be on the point of extinction. In 1901 there were made 138,628 barrels valued at \$107,625, while in 1905 three factories produced 14,741 barrels worth \$10,402, and the same number of plants turned out in 1906 only 8,453 barrels, valued at \$6,000. Nearly the whole of this output was from one factory, the other two having practically suspended operations. The reason assigned for this state of affairs by the manufacturers is the general preference shown by builders and the public generally for Portland cement. Doubtless this preference is due to some extent at least to the more uniform composition, and hence more satisfactory results, of Portland cement as compared with the natural rock article. For a variety of uses, however, where homogeneity is not essential, the latter is quite as useful and considerably cheaper. It is therefore matter for regret that its manufacture appears to be coming to an end.

Table XI.—Production of Cement, 1891 to 1906

Year.	NATURAL ROCK.		PORTLAND.		TOTAL.	
	Bbl.	Value. \$	Bbl.	Value. \$	Bbl.	Value. \$
1891.....	46,178	39,419	2,033	5,082	48,211	44,501
1892.....	51,155	38,580	20,247	47,417	74,402	85,997
1893.....	74,353	63,567	31,924	63,848	106,277	127,415
1894.....	55,323	48,774	30,580	61,060	85,903	109,834
1895.....	55,219	45,145	58,699	114,332	113,918	159,477
1896.....	60,705	44,100	77,760	138,230	138,465	182,330
1897.....	84,670	76,123	96,825	170,302	181,495	246,425
1898.....	91,528	74,222	153,348	302,096	244,876	376,318
1899.....	139,487	117,039	222,550	444,228	362,037	561,266
1900.....	125,428	99,994	306,726	598,021	432,154	698,015
1901.....	138,628	107,625	350,660	563,255	489,288	670,880
1902.....	77,300	50,795	522,899	916,221	600,199	967,016
1903.....	89,549	69,319	695,260	1,182,799	784,809	1,252,118
1904.....	85,000	65,250	880,871	1,239,971	965,871	1,305,221
1905.....	14,711	10,402	1,251,360	1,783,451	1,269,101	1,793,853
1906.....	8,453	6,000	1,598,815	2,381,014	1,607,268	2,387,014
Totals.....	1,200,717	956,354	6,303,557	10,011,326	7,513,274	10,967,680

Corundum

There were produced from the corundum mines of Renfrew and Hastings counties in 1906, 2,914 tons of grain corundum valued at \$262,448. This is a decided increase over 1905 when the output was 1,681 tons valued at \$152,464. The operating companies are the Canada Corundum Company and the Ashland Emery and Corundum Company. The mines and concentration plant of the former are at Craigmont in the county of Renfrew, and of the latter at Burgess Mines, Hastings county. Most of the production of 1906 is to be credited to the Canada Corundum Company.

Table XII gives particulars of the corundum industry during the last five years:

Table XII.—Production of Corundum, 1902 to 1906

Schedule.	1902.	1903.	1904.	1905.	1906.
Corundum produced..... tons	1,137	1,119	1,665	1,681	2,914
Value of product.....\$	83,871	87,600	150,645	152,464	262,448
Workmen.....No.	95	186	202	216	235
Wages paid.....\$	34,674	106,332	139,548	109,128	160,354

Feldspar

The quarrying of feldspar for use in the manufacture of pottery, enamelled ware, etc., is developing into an industry of some importance. It has its seat in the county of Frontenac on the Kingston and Pembroke railway. The rock is blasted out on the open-work system, and is shipped to Ohio and New Jersey for use as above. The producing companies last year were the Kingston Feldspar and Mining Company, the Kingston Mining and Development Company, and the Verona Mining Company. The quantity of feldspar raised during the year was 20,378 tons valued at \$43,849; 89 workmen were employed, to whom wages were paid amounting to \$40,807.

Hitherto all the feldspar exported has come from the above locality, principally from the neighborhood of Verona, but large deposits of apparently available rock have recently been found in the township of South Canonto, in the same county, which are being developed.

Table XIII gives statistics of feldspar production for the last five years:

Table XIII.—Production of Feldspar, 1902 to 1906

Schedule.	1902.	1903.	1904.	1905.	1906.
Feldspar raised.....tons	8,776	15,296	10,983	12,234	20,378
Value of product.....\$	12,875	20,046	21,966	29,968	43,849
Workmen employed.....No.	66	51	34	52	89
Wages paid.....\$	10,250	14,089	16,300	19,200	40,807

Iron Pyrites

There was an increased production of iron pyrites in 1906 as compared with 1905, the output being 11,090 tons worth \$40,583, while in 1905 it was 7,325 tons valued at \$21,885. The producing companies were the American Madoc Mining Company, which has two mines, one near Bannockburn and the other near Tweed; the British American Company, whose mine is near Queensboro; the Northland Mining Company, which has begun mining on a deposit at Rib lake on the Temiskaming and Northern Ontario

railway, and the Lake Superior Power Company. The last named Company raised a quantity of the pyrite found in the Helen iron mine, where its associations with the iron ore of that mine have attracted the attention of geologists.⁷

The element sulphur is widely distributed throughout the mineral-bearing rocks of Ontario; indeed it may be said to be present in one form or other in most, if not all, of the metallic deposits hitherto worked. From the nickeliferous pyrrhotites of the Sudbury region, which are worked so extensively for their nickel and copper contents, thousands of tons of sulphur are expelled every year as sulphurous fumes into the open air; the copper ores of Ontario are wholly sulphides, with the exception of the native copper found on the northern and eastern shores of lake Superior; in the auriferous quartz veins of the northwestern part of the Province, iron pyrites usually occurs more or less abundantly and generally carries part of the gold values; sulphur is of course an essential constituent of the mispickel deposits of Hastings county and northeastern Ontario, of the galena of Frontenac and Hastings, and the zincblende of eastern Ontario and the Port Arthur region; it is a minor constituent of the cobalt and nickel arsenides of Cobalt and enters into combination with the silver of those deposits to form argentite, the same being true of the silver ores of lake Superior; and as disseminated pyrite it occasionally contaminates the iron ores of eastern and northern Ontario. In chemical union with calcium it constitutes the gypsum beds of the Grand river and the James bay slope, and even in the petroleum of southwestern Ontario it makes its presence known and requires to be eliminated in refining. In most of these minerals sulphur is a deleterious, or at the best a redundant ingredient, although in some, as in the nickel-copper ores of Sudbury, it can be utilized in the process of reduction as a source of heat, and from none of them by present methods of treatment can this substance, so useful when isolated, be economically extracted. But when united with iron as iron pyrites, or FeS_2 , the sulphur can by roasting be dissociated from the iron and recovered by one or other of the two processes now chiefly employed in the manufacture of sulphuric acid. The use of this acid lies at the foundation of a very large part of the chemical industry, and as investigation of the mineral resources of this Province proceeds, it becomes apparent that in Ontario we have widely distributed very large supplies of the raw material out of which sulphuric acid is made, the possession of which makes possible the establishment and successful prosecution of many diverse and important manufactures. Under instructions of the Bureau of Mines, Mr. E. L. Fraleek, M.E., undertook an examination of the various known pyrites deposits of the Province, and his report under the heading "Iron Pyrites in Ontario" in the present volume will be read with interest.

Table XIV presents statistics of the iron pyrites industry for five years past.

Table XIV.—Production of Iron Pyrites, 1902 to 1906

Schedule.	1902.	1903.	1904.	1905.	1906.
Pyrites raised	4,371	7,469	13,451	7,325	11,090
Value of do.	14,993	21,693	43,716	21,885	40,583
Workmen employed	45	39	60	68	128
Wages paid	6,585	16,327	22,875	27,690	57,580

Mica

The production of mica in this Province is now largely in the hands of large operators, of whom the General Electric Company is chief. Under the name of the Loughborough Mining Company, Limited, this company raised large quantities of mica

⁷ A. P. Coleman and A. B. Willmott in 11th Rep. Bur. Min., p. 170; A. P. Coleman in 15th Rep. Bur. Min., p. 188; W. G. Miller in 12th Rep. Bur. Min., p. 103, etc. See also E. L. Fraleek's description of the deposit in "Iron Pyrites in Ontario" in the present volume.

from the Lacey mine near Sydenham, and also from its properties near Perth. Other producers were the Financial Development Company (Martha mine), Kent Bros., Kingston, (Bedford township), J. W. Trousdale, (Gould lake), James Richardson Sons, Kingston, (Richardson mine), and W. L. McLaren, Perth, (North Burgess township). The production was returned as 355 tons of rough-cobbed mica, worth \$69,041. Most, if not all, of this was of the amber variety.

Canadian mica, whether from the mines of Ontario or Quebec, has a good reputation for flexibility, freedom from stains, etc., and has been introduced into the markets of Great Britain with some success. In European markets, however, it has a strong competitor in Indian mica, and trial shipments made to France have not met with favor, being composed of pieces too small in size, and accompanied by terms of payment, etc., not acceptable to French buyers. At present the mica mined in Ontario goes mainly to the United States.

Salt

From the salt wells of the Province 50,414 tons of salt were raised in 1906, having a value of \$367,738. This is a falling off in quantity but an increase in value as compared with the output of 1905, when the quantity produced was 60,415 tons worth \$356,783. The bulk of the salt made in Ontario comes from the wells of the Canadian Salt Company, Windsor; the other producers in 1906 were the Exeter Salt Company, Exeter; Gray, Young and Sparling, Limited, Wingham; R. & J. Ransford, Clinton and Stapleton; Ontario People's Salt and Soda Company, Kincardine; and the Parkhill Salt Company, Parkhill. The number of hands employed in the raising and manufacture of salt was 213, to whom \$94,768 was paid in wages.

Table XV gives statistics of the salt industry for five years ending with 1906.

Table XV.—Production of Salt, 1902 to 1906

Schedule.	1902.	1903.	1904.	1905.	1906.
Salt produced tons	62,011	58,274	55,877	60,415	50,414
Value of salt produced \$	344,620	388,097	362,621	356,783	367,738
Workmen employed No.	198	208	183	148	151
Wages paid \$	76,154	87,995	84,682	68,580	69,153

Petroleum

The oil fields of Lambton and Kent counties continue to furnish the whole of the oil produced in Ontario, and practically the whole of the oil produced in Canada. It is only natural that during the forty years and more for which the oil fields of Petrolea and Oil Springs have been yielding oil, there should be a diminution in the rate of production. Formerly, the whole of the oil came from the Corniferous formation, and it would seem that these reservoirs are showing symptoms of gradual depletion; but latterly, more deep-seated strata have proven to be oil-bearing, and wells in the Guelph, Medina and Clinton formations are now yielding largely and promise to counteract the lessening flow of the older fields. In the township of Tilbury East a new field, apparently of considerable extent, and a smaller pool in the township of Romney, were brought in last year, particulars of which are given elsewhere in this Report. The yield of crude in 1906 was 19,928,322 Imperial gallons valued at \$761,546, as compared with 22,131,658 Imperial gallons worth \$898,545 in 1905. The decrease in considerable, but the quantity is greater than in any year since 1902 save 1905. The value of the oil as given does not include the bounty of one and one-half cents per Imperial gallon paid by the Dominion government. There can be little doubt that this

bounty acts as a stimulus to the production of crude oil in this Province. For purposes of this bounty all crude oil produced in this or any other Province is required to be reported to the Department of Trade and Commerce, Ottawa, to whom the Bureau is indebted for courteously furnishing the figures of production. The only other source of crude oil in Canada is New Brunswick, from which an output of 13,035 gallons was reported last year. A slightly different estimate of production in Ontario is made by the Imperial Oil Company of Sarnia, whose sources of information are unquestionably good. This company places the output at 585,328 barrels, or 20,486,483 gallons, and credits it by districts as follows:

	Bbl.
Dutton	18,596
Leamington	35,957
Wheatley	775
Bothwell	42,836
Richardson (Chatham)	1,376
Thamesville	1,584
Moore Township	53,029
Oil Springs	68,099
East Tilbury	115,400
Pelee Island	378
Petrolia	246,292
Total	585,328

The highest price which crude oil reached during the year was \$1.38 per barrel on the 25th April, and the year closed at the lowest figure, \$1.30 per barrel. The average price, not including the Dominion bounty of 52½ cents, was \$1.3375 per barrel.

The crude oil produced by Ontario wells is not now sufficient to meet the requirements of the home market, or equal to the capacity of Ontario refineries, of which there are two—the Imperial Oil Company works at Sarnia, and the Canadian Oil Refining Company's plant at Petrolia. The removal of the duty of two cents per gallon formerly imposed on imported crude permits the refiners to make free use of American oil, and of the total quantity of oil distilled during the year, namely 36,134,349 gallons, 16,679,544 gallons, or 46 per cent. was imported from the United States. In 1905 the proportion of imported crude distilled was only 34 per cent.

The article entitled "Oil and Gas in Kent" in this Report, by Mr. C. W. Knight, presents data regarding recent developments in this new field.

Table XVI gives statistics of the crude oil and petroleum products for 1906, and comparative figures for the four preceding years:

Table XVI.—Petroleum and Petroleum Products, 1902 to 1906

Schedule.		1902.	1903.	1904.	1905.	1906.
Crude produced	Imp. gal.	18,185,592	16,640,338	17,237,220	22,131,658	19,928,322
Crude distilled	"	15,630,592	14,464,248	22,805,109	33,821,998	36,134,349
Value crude produced	\$	940,104	1,024,597	904,437	898,545	761,546
Value distilled products	"	1,298,961	1,451,756	1,670,805	2,196,678	2,506,177
Illuminating oil	Imp. gal.	7,720,866	7,096,073	11,461,435	16,433,588	16,125,450
Lubricating oil	"	2,765,677	2,614,313	2,683,281	3,402,977	4,351,818
Benzine and naphtha	"	902,847	832,153	1,488,503	2,827,971	3,497,954
Gas and fuel oils and tar	"	2,157,039	1,968,172	1,962,752	5,788,351	5,961,834
Paraffin wax and candles	Lb.	2,433,127	2,673,806	2,272,511	4,077,610	5,011,467
Workmen employed	No.	323	291	406	469	496
Wages paid	\$	169,398	165,700	229,555	280,701	308,986

Natural Gas

The output from the natural gas wells of the Province in 1906 showed a marked increase over that for 1905, the value of the product being \$533,446 as against \$316,476. This result is largely due to the development of the Haldimand county field, in which the Dominion Natural Gas Company is the largest producer. In the Welland county field the Provincial Natural Gas and Fuel Company and the Mutual Natural Gas

Company are the chief operators. From its wells in Welland the Provincial Company pipes a large part of the product to Buffalo, N. Y., and supplies as well several towns and villages in Ontario. The Dominion Company in the Haldimand field sends gas to Hamilton, Dundas, Brantford, Galt, Paris and a number of other places. In the county of Essex the Leamington Oil Company obtains a sufficient supply for the wants of the inhabitants of that town. Some of the oil wells sunk in the new Tilbury and Romney fields yield a good deal of gas.

Table XVII shows the course of the natural gas industry during the past five years.

Table XVII.—Natural Gas Production, 1902 to 1906

Schedule.		1902.	1903.	1904.	1905.	1906.
Value gas produced	\$	199,238	196,535	253,324	316,476	533,146
Producing wells	No.	169	210	176	273	332
Producing wells sunk	"	18	20	36	58	77
Non-producing wells sunk	"	13	12	13	5	14
Delivery pipe	miles	369	312	231	461	550
Workmen employed	No.	107	138	98	130	108
Wages paid	\$	55,618	79,945	53,674	88,865	61,968

Of the producing wells 225 were in the Welland county field, and 104 in the Haldimand county field.

Minor Products

Arsenic is at present not being mined for itself, but is a by-product of the Cobalt ores. It is estimated that some 1,440 tons of arsenic were contained in the shipments made from that camp during the year. Of this some 200 tons were recovered as merchantable white arsenic at the Copper Cliff reduction works, where about 1,000 tons of silver-cobalt ore were treated. The remainder was exported either in the ore shipped from Cobalt, or in the speiss resulting from the Copper Cliff process.

The reduction plant formerly operating at Deloro on the mispickel ores of Hastings county has been idle for several years, but has been acquired by the Deloro Mining and Reduction Company, and will, it is expected, shortly be treating the product of the Hastings mines as well as those of the Cobalt camp, for the extraction of the arsenic and the other constituents of value.

At the present time the arsenic contents of the Cobalt ores are valueless to the mine owners, the buyers of ore refusing to pay for them.

Calcium carbide for use in the production of acetylene gas was made at the Ottawa and Merritton factories to the extent of 2,626 tons, valued at \$162,780. There were 80 men employed in the two establishments, who were paid in wages \$38,981.

At the graphite properties owned by the Globe Refining Company near Port Elmsley and the Ontario Graphite Company in Brougham township (Black Diamond mine) 1,772 tons of crude graphite were produced, valued at \$15,000. The industry gave employment to 41 men, who received \$12,000 in wages.

There were mined 3,265 tons of crude gypsum from the deposits along the Grand river, the output having a value of \$3,265. By the Alabastine Company of Paris the raw material is worked up into a variety of useful commodities such as wall plasters, alabastine, etc. The use of gypsum as a fertilizer does not seem to be increasing.

Of peat fuel some 400 tons only were manufactured during the year, the product being a fuel for special purposes made by Alex. Dobson of Beaverton. The difficulties of climate and treatment in the way of producing a thoroughly satisfactory and economic fuel from the peat bogs of the Province have been formidable enough

to discourage not a few of the inventors and experimenters who have taken the task in hand. There can be little doubt, however, that a solution of this important problem will ultimately be found.

Two new minerals find a place in the list of production for 1906, namely, quartz and sodalite. The former, principally for flux and converter linings, was raised to the extent of 48,376 tons valued at \$65,765 by the Canadian Copper Company and Algoma Commercial Company. Some 200 cubic feet of sodalite was taken out of the quarries of the Princess Quarries Company near Bancroft, Hastings county. The stone is of a beautiful blue color, and is highly esteemed for interior decorative work.

Some 1,235 tons of talc were mined from a property near Madoc and exported to the United States. The value at the pit's mouth was \$3,030.

Mining Revenue

Following is a statement of the moneys received for the sale and lease of Crown lands for mining purposes during 1906:

District.	Sales.			Leases.			Totals.		
	No.	Ac.	Amount. \$	No.	Ac.	Amount. \$	No.	Ac.	Amount. \$
Rainy River.....	16	950	2,176	40	4,024	4,024	56	4,974	6,200
Thunder Bay.....	5	964	1,977	14	2,319	2,319	19	3,283	4,296
Algoma.....	10	924	2,327	17	2,468	2,468	27	3,392	4,795
Nipissing.....	59	1,599	4,581	14	954	914	73	2,553	5,495
Elsewhere.....	7	440	927	33	3,619	3,452	40	4,059	4,379
Total.....	97	4,877	11,988	118	13,384	13,177	215	18,261	25,165

The above table has reference only to lands sold and leased within the year. The gross receipts on account of lands disposed of for mining purposes in 1906 and previously, was \$118,244 for sales and \$46,620 for leases. In addition to this, there were receipts for miner's licenses, recording fees, etc., \$70,256, and for mining royalties \$15,000.

Tabulated, the moneys received from mining sources were as follows:

Sales.....	\$118,244
Leases.....	46,621
Miners' licenses and fees.....	70,256
Royalties.....	15,000
Total.....	\$250,121

The system of leasing mining lands, first introduced in 1891, was abolished by the amendments to the mining laws made in 1906, except as regards lands in the Forest Reserves, but the right was reserved to applicants to obtain such leases where applications were pending at the time the law was changed. In a number of cases, owing to the lands being heavily covered with timber, or for other reasons, applications before the Department could not be completed. Some of these were carried to a conclusion before the close of the year, and are included in the above Table. The law of 1891 required the lessee or patentee of mining lands to expend a certain amount of money per acre within a given time in development work, in default of which his grant was subject to forfeiture. The law of 1906 reversed this, and required an applicant after staking and recording his claim to perform 240 days' work upon it, after which he is entitled, subject to other provisions of the law, to obtain a grant from the Crown free from any further working conditions.

One of the changes introduced into the mining laws in 1906 was a provision making it necessary for a prospector to hold a miner's license before having the right to stake

out mining claims on lands belonging to the Crown. These licenses expire annually on the 31st of March, and were issued on payment of a fee of ten dollars each. By an amendment passed in the session of 1907 this fee was reduced to five dollars, and to three dollars for a license issued after the 1st of October. Fees for recording mining claims, transfers, etc., were also provided for, and from these sources, which may be called current revenue, a very considerable sum was received last year, amounting as shown in the foregoing table, to \$70,256. Mining companies are also required to hold a miner's license, the fee for which is based on the amount of capital stock. Owing to the activity of prospecting and claim staking which is likely to continue throughout 1907 and probably longer, receipts from this source for the coming year will probably show a considerable increase.

Another source of revenue, which appears in the accounts of the Province for the first time is royalties, from which \$15,000 was derived in 1906. This sum was not the result of a general levy on minerals or on any specified kind of minerals, as royalties were done away with in 1900, but was received on shipments of silver-cobalt ore from the O'Brien silver-cobalt mine, in which the Government of Ontario holds an interest. It will be remembered that a suit was instituted by the Attorney-General of the Province to test the validity of certain grants of land in the township of Coleman made on the strength of affidavits of discovery whose truthfulness there was afterwards reason to doubt. The litigation was settled by a consent judgment, the effect of which was to award twenty-five per cent. of the proceeds of the mine to the Province, less a certain proportion of expenses for handling the ore above ground, transporting, etc. The mine was left in possession of the owners, but was charged with the payment of this royalty. Under the terms of the agreement payment is to be made quarterly based on the shipments of the previous three months. The only ore on which the royalty accrued due during 1906 was a carload which had been shipped in 1905, the proceeds of which amounted to upwards of \$65,000. As the mine is a valuable one and is now to be actively worked, the Provincial treasury will no doubt benefit largely by reason of these royalties.

Mining Companies

The schedule given below shows the mining companies incorporated under the laws of Ontario and also companies of foreign incorporation licensed to do business in this Province, during 1906. Of the former, 263 concerns were organized with a nominal capital aggregating \$184,677,000, and of the latter, 18 received licenses having a united capital of \$12,536,000. The increase of companies as compared with 1905 was very marked, the numbers being 263 and 99, and aggregate capital \$184,677,000 and \$27,509,000 respectively. The larger part of the increase, as will be seen by looking over the list, was due to the great activity in exploiting the silver-cobalt field.

Mining Companies Incorporated, 1906

Name of Company.	Head Office.	Date of Incorporation.	Capital. \$
Abitibi and Cobalt Mining Company, Limited.....	Sault Ste. Marie.....	March 10, 1906.....	2,500,000
Algoma Custom Smelting and Refining Company, Limited.....	Sault Ste. Marie.....	November 28, 1906.....	250,000
Amalgamated Cobalt Mines, Limited.....	Toronto.....	June 23, 1906.....	1,000,000
Anima-Nipissing Silver Mines, Limited.....	Cobalt.....	November 22, 1906.....	300,000
Anthony Blum Gold Mines, Limited.....	Toronto.....	November 28, 1906.....	100,000
Argentite Mining and Smelting Company, Limited.....	Toronto.....	April 24, 1906.....	2,000,000
Atlantic Oil Company, Limited.....	Toronto.....	June 30, 1906.....	2,000,000
Banner Cobalt Mining Company, Limited.....	Wind-sor.....	December 12, 1906.....	400,000
Barnard-Argue-Roth-Stearns Oil and Gas Company, Limited.....	Chatham.....	October 3, 1906.....	400,000
Baxter Oil Company, Limited.....	Thamesville.....	October 26, 1906.....	50,000
Beaver Silver Cobalt Mining Company, Limited.....	New Liskeard.....	April 24, 1906.....	500,000
Becktels, Limited.....	Waterloo.....	November 30, 1906.....	75,000
Ben Allen Portland Cement Company, Limited.....	Owen Sound.....	February 14, 1906.....	500,000

Mining Companies Incorporated 1906.—Continued

Name of Company.	Head Office.	Date of Incorporation.	Capital. \$
Bonanza Reef Extension, Limited.....	Toronto.....	December 14, 1906.....	100,000
Boston Mines, Limited.....	Toronto.....	July 26, 1906.....	50,000
Burrone, Larder Lake Gold Mining Company, Limited.....	New Liskeard.....	December 5, 1906.....	500,000
Calumet Cobalt Mining Company, Limited.....	Haileybury.....	November 24, 1906.....	500,000
Campbell-Crawford Cobalt Silver Mining Company, Limited.....	Cobalt.....	December 12, 1906.....	1,000,000
Canada Minerals, Limited.....	Toronto.....	September 26, 1906.....	100,000
Canada and United States Oil and Gas Company, Limited.....	Chatham.....	October 12, 1906.....	30,000
Casey Cobalt Silver Mining Company, Limited.....	Haileybury.....	December 19, 1906.....	100,000
Cobalt-American Development Company, Limited.....	Toronto.....	March 16, 1906.....	600,000
Cobalt Annex Silver Mines, Limited.....	Haileybury.....	November 16, 1906.....	500,000
Cobalt Bullion Mines, Limited.....	Haileybury.....	December 7, 1906.....	1,000,000
Cobalt Chief Silver Mining Company, Limited.....	Toronto.....	November 28, 1906.....	3,000,000
Cobalt Consolidated Mines, Limited.....	Cobalt.....	March 16, 1906.....	2,500,000
Cobalt Diamond Drilling and Development Company, Limited.....	Toronto.....	September 26, 1906.....	100,000
Cobalt and Hudson Bay Development Company, Limited.....	Haileybury.....	April 6, 1906.....	100,000
Cobalt Lake Mining Company, Limited.....	Toronto.....	December 22, 1906.....	5,000,000
Cobalt Merger, Limited.....	Toronto.....	November 28, 1906.....	3,000,000
Cobalt Mines Syndicate, Limited.....	Toronto.....	December 28, 1906.....	100,000
Cobalt Monarch Mining Company, Limited.....	Toronto.....	November 24, 1906.....	500,000
Cobalt Native Silver Mining Company, Limited.....	Haileybury.....	November 7, 1906.....	500,000
Cobalt and New Ontario Prospectors, Developers and Investors, Limited.....	Toronto.....	November 16, 1906.....	500,000
Cobalt North-Ontario Mining Company, Limited.....	Haileybury.....	January 31, 1906.....	40,000
Cobalt Nugget Silver, Limited.....	Haileybury.....	April 28, 1906.....	40,000
Cobalt Silver Queen, Limited.....	Cobalt.....	April 6, 1906.....	1,500,000
Cobalt Silver Ores, Limited.....	Toronto.....	November 16, 1906.....	1,000,000
Cobalt Silver Prince, Limited.....	Cobalt.....	November 16, 1906.....	1,000,000
Cobalt Smiley Mining Company, Limited.....	Toronto.....	November 16, 1906.....	40,000
Cobalt Townsite Mining Company, Limited.....	North Bay.....	April 9, 1906.....	100,000
Cobalt Union Mines, Limited.....	Toronto.....	November 16, 1906.....	1,000,000
Coin Silver Mining Company, Limited.....	Windsor.....	November 21, 1906.....	300,000
Coleman and Quebec Mining Company, Limited.....	Ottawa.....	November 28, 1906.....	1,000,000
Dardanelles (Larder Lake) Gold Mines, Limited.....	Toronto.....	December 19, 1906.....	250,000
Davis Silver Cobalt Mines, Limited.....	Toronto.....	December 5, 1906.....	2,000,000
Deep Rock Cobalt Silver Mines, Limited.....	Toronto.....	December 21, 1906.....	1,000,000
Detroit and Algoma Silver Mining Company, Limited.....	Windsor.....	August 15, 1906.....	100,000
Duluth Cobalt Mining Company, Limited.....	Haileybury.....	December 28, 1906.....	500,000
Edward Cobalt Mines, Limited.....	Toronto.....	November 16, 1906.....	100,000
Empress Cobalt Silver Mining Company, Limited.....	Toronto.....	November 9, 1906.....	500,000
Erie Cobalt Silver Mining Company, Limited.....	Toronto.....	May 28, 1906.....	1,000,000
Floyd Silver Mines, Limited.....	Toronto.....	March 13, 1906.....	2,000,000
Foster Cobalt Mining Company, Limited.....	Toronto.....	February 14, 1906.....	1,000,000
Forest Reserve Mining Company, Limited.....	Toronto.....	November 16, 1906.....	100,000
Freeda Larder Lake Gold Mining Company, Limited.....	Toronto.....	December 21, 1906.....	500,000
Gallagher Iron Mining Company, Limited.....	Sault Ste. Marie.....	June 13, 1906.....	500,000
Giant Silver Nugget Mines, Limited.....	Haileybury.....	June 13, 1906.....	500,000
Glen Lake Mining Company, Limited.....	Toronto.....	April 24, 1906.....	500,000
Golden Park Mining Company, Limited.....	Windsor.....	October 12, 1906.....	100,000
Gordon Benson Cobalt Mining Company, Limited.....	Toronto.....	October 3, 1906.....	300,000
Great Lakes Portland Cement Company, Limited.....	Toronto.....	June 13, 1906.....	1,000,000
Green-Meehan Mining Company, Limited.....	Toronto.....	October 24, 1906.....	2,500,000
Hanson Consolidated Mining and Milling Company, Limited.....	Toronto.....	April 11, 1906.....	1,500,000
Harris-Maxwell Gold Mining Company, Limited.....	Toronto.....	November 30, 1906.....	50,000
Hudson Bay Extended, Limited.....	Toronto.....	April 17, 1906.....	100,000
Huron Oil Producers, Limited.....	Petrolia.....	March 10, 1906.....	60,000
Imperial Cobalt Silver Mines Company, Limited.....	Toronto.....	November 16, 1906.....	1,000,000
Independence Cobalt Silver Mines Company, Limited.....	Toronto.....	December 28, 1906.....	1,000,000
Iroquois Cobalt Silver Mining Company, Limited.....	Haileybury.....	May 3, 1906.....	100,000
Keewatin Silver Cobalt Mining Company, Limited.....	Toronto.....	December 5, 1906.....	1,000,000
Kennedy Cobalt, Limited.....	Toronto.....	December 21, 1906.....	1,000,000
King Cobalt Mining Company, Limited.....	Toronto.....	January 24, 1906.....	300,000
Latchford Silver Mining Company, Limited.....	Toronto.....	November 21, 1906.....	100,000
Larder Lake Gold Mining Company, Limited.....	Haileybury.....	October 17, 1906.....	500,000
Lehigh Portland Cement Company, Limited.....	Township of Thurlow.....	September 19, 1906.....	1,000,000
Little Nipissing Silver Cobalt Mining Company, Limited.....	Toronto.....	November 2, 1906.....	650,000
Maple City Oil and Gas Company, Limited.....	Chatham.....	July 26, 1906.....	40,000
Mining Development and Securities Company, Limited.....	Toronto.....	April 20, 1906.....	150,000
Montreal Cobalt Mining Company, Limited.....	Toronto.....	March 14, 1906.....	500,000
New York and Canadian Mining Company, Limited.....	Toronto.....	January 5, 1906.....	40,000
New York and Ontario Oil and Gas Company, Limited.....	Chatham.....	October 12, 1906.....	30,000
Nipissing Copper and Silver Company, Limited.....	Toronto.....	December 14, 1906.....	3,500,000
North Bay Brick and Tile Company, Limited.....	North Bay.....	July 16, 1906.....	50,000
North Cobalt Mining Company, Limited.....	Cobalt.....	November 7, 1906.....	50,000
Northland Mining Company, Limited.....	London.....	December 5, 1906.....	250,000
North Ontario Reduction and Refining Company, Limited.....	Toronto.....	June 13, 1906.....	500,000
North Range Nickel and Iron Mining Company, Limited.....	Sudbury.....	May 12, 1906.....	1,000,000
Nova Scotia Silver Cobalt Mining Company, Limited.....	Toronto.....	November 9, 1906.....	2,000,000
Ontario Quebec Cobalt Mining Company, Limited.....	Toronto.....	December 28, 1906.....	1,000,000
Ore Contracting Company, Limited.....	Bessemer.....	November 7, 1906.....	40,000
Peerless Larder Lake Mines, Limited.....	Toronto.....	December 5, 1906.....	1,000,000
Penn Cobalt Mining Company, Limited.....	Toronto.....	December 19, 1906.....	500,000

Mining Companies Incorporated 1906.—Continued

Name of Company.	Head Office.	Date of Incorporation.	Capital \$
Pennsylvania Cobalt Silver Mines, Limited.	Toronto.	December 21, 1906	1,000,000
Peterson Lake Silver Cobalt Mining Company, Limited.	Toronto.	April 11, 1906	3,000,000
Rochester Mining Company, Limited.	Toronto.	August 21, 1906	40,000
St. Anthony Cobalt Mining Company, Limited.	Haileybury.	December 5, 1906	100,000
Sasagenaga Mining Company, Limited.	Cobalt.	June 8, 1906	250,000
Silverhorn Mining Company, Limited.	Toronto.	April 6, 1906	50,000
Silver Horse Shoe Cobalt Mining Company, Limited.	Toronto.	December 28, 1906	40,000
Silver Ledge, Limited.	Toronto.	April 24, 1906	20,000
Silver Wonder Mining Company, Limited.	Toronto.	April 24, 1906	300,000
Sombra Oil and Gas Company, Limited.	Chatham.	November 7, 1906	40,000
Standard Cobalt Mines, Limited.	Toronto.	December 19, 1905	2,000,000
Star Silver Cobalt Mining Company, Limited.	Toronto.	April 11, 1906	2,000,000
Stellar Silver Cobalt Corporation, Limited.	Sudbury.	November 28, 1906	1,000,000
The Abitibi Mining and Development Company, Limited.	Finch.	January 12, 1906	100,000
The Albert Mining Company, Limited.	Toronto.	May 12, 1906	375,000
The Alder Street Natural Gas Company, of Dunnville, Limited.	Dunnville.	December 12, 1906	20,000
The Amalgamated Oil Company of Canada, Limited.	London.	June 4, 1906	1,000,000
The Amalgamated Petroleum Producers, Limited.	Belleville.	April 20, 1906	40,000
The American Cobalt Mines, Limited.	Toronto.	February 15, 1906	1,000,000
The American Silver King Mining Company, Limited.	Haileybury.	May 30, 1906	1,000,000
The Bailey Mining Company, Limited.	Windsor.	August 15, 1906	5,000,000
The Barron Brick Company, Limited.	Toronto.	September 19, 1906	500,000
The Big Six Silver Cobalt Mines, Limited.	Cobalt.	December 12, 1906	1,750,000
The British American Oil Company, Limited.	Toronto.	October 17, 1906	200,000
The British American Silver Company, Limited.	Toronto.	August 24, 1906	50,000
The Brooks Hudson Silver Mining Company, Limited.	New Liskeard.	November 30, 1906	500,000
The Brussels Oil Company, Limited.	Brussels.	April 4, 1906	100,000
The Bucke Silver and Cobalt Mining Company, Limited.	Ottawa.	December 19, 1906	300,000
The Buffalo Mines, Limited.	Toronto.	April 27, 1906	1,000,000
The Canadian Cobalt and Silver Mining Company, Limited.	Ottawa.	January 19, 1906	250,000
The Canadian Cobalt Corporation, Limited.	Toronto.	November 28, 1906	1,000,000
The Canadian General Industrial and Development Company, Limited.	Chatham.	November 30, 1906	150,000
The Capital Cobalt Mining Company, Limited.	Ottawa.	December 5, 1906	250,000
The Central Oil and Gas Company, Limited.	Toronto.	March 6, 1906	40,000
The Century Silver Mining Company, Limited.	Toronto.	December 14, 1906	1,000,000
The Cheapside Natural Gas and Oil Company, Limited.	Cheapside.	January 19, 1906	10,000
The City of Cobalt Mining Company, Limited.	Cobalt.	October 5, 1906	500,000
The Clarks Standard Developing Company, Limited.	New Liskeard.	January 19, 1906	40,000
The Clear Lake Mining Company, Limited.	Toronto.	May 16, 1906	650,000
The Cleveland Cobalt Silver Mines, Limited.	Toronto.	October 12, 1906	1,000,000
The Cobalt and Larder Lake Gold Mining Company, Limited.	New Liskeard.	December 19, 1906	300,000
The Cobalt Central Silver Mining Company, Limited.	New Liskeard.	April 24, 1906	500,000
The Cobalt Chartered Company, Limited.	Haileybury.	April 27, 1906	350,000
The Cobalt Contract Silver Mines Company, Limited.	Toronto.	May 16, 1906	300,000
The Cobalt Ore Sampling Company, Limited.	Cobalt.	December 28, 1906	100,000
The Cobalt Portage Mines, Limited.	Toronto.	October 26, 1906	1,000,000
The Cobalt, Silver and Copper Mining Company, Limited.	Sault Ste. Marie.	February 23, 1906	500,000
The Cobalt Smelting and Refining Company, Limited.	Toronto.	May 18, 1906	250,000
The Colonial Mining Company, Limited.	Cobalt.	October 19, 1906	100,000
The Columbus Cobalt Silver Company, Limited.	Toronto.	April 24, 1906	450,000
The Commercial Brick Company, Limited.	Toronto.	July 18, 1906	50,000
The Coniagas Mines, Limited.	St. Catharines.	November 24, 1906	4,000,000
The Croesus Mining Company, Limited.	Ottawa.	January 19, 1906	500,000
The Crown Mining Company, Limited.	Leamington.	January 26, 1906	1,000,000
The Cuyahoga Silver Cobalt Mines, Limited.	Toronto.	November 24, 1906	1,000,000
The Detroit and Cobalt Development Company, Limited.	Windsor.	April 17, 1906	25,000
The Dominion Cobalt Mining and Development Company, Limited.	Cobalt.	May 3, 1906	450,000
The Douglas Mining Co., Limited.	Toronto.	November 16, 1906	500,000
The Dufferin Cobalt Silver Mining Company, Limited.	Ottawa.	November 30, 1906	1,000,000
The Dunnville Gas Development Company, Limited.	Dunnville.	May 12, 1906	40,000
The Dwyer Mining Company, Limited.	Toronto.	January 5, 1906	100,000
The Erie Natural Gas Company, Limited.	Dunnville.	October 17, 1906	40,000
The Esperanza-Cobalt Mines Company, Limited.	Windsor.	November 21, 1906	1,000,000
The Eureka Silver Mining Company, Limited.	New Liskeard.	April 24, 1906	100,000
The Exploration Company of Canada, Limited.	Toronto.	November 7, 1906	100,000
The Findlay Mining Company, Limited.	Windsor.	April 24, 1906	20,000
The Florence Mining Company, Limited.	Toronto.	March 21, 1906	100,000
The German Canadian Smelting and Refining Company, Limited.	Toronto.	July 6, 1906	1,000,000
The Gillies Silver Mining Company, Limited.	Haileybury.	April 9, 1906	500,000
The Gilpin Cobalt Silver Mining Company, Limited.	Toronto.	April 24, 1906	500,000
The Gold and Silver Mountain Mining Company, Limited.	Cobalt.	December 5, 1906	1,000,000
The Golden Reed Mining Company, Limited.	Sault Ste. Marie.	August 31, 1906	1,200,000
The Green Rock Mining Company, Limited.	Sault Ste. Marie.	April 24, 1906	600,000
The Heathcock Mining Company, Limited.	Dresden.	October 12, 1906	100,000
The Hudson Cobalt Mining Company, Limited.	Barrie.	June 27, 1906	300,000
The Hunter Cobalt Silver Mining Company, Limited.	Ottawa.	November 21, 1906	1,000,000
The Hunton Cobalt Silver Mining Company, Limited.	Cobalt.	August 21, 1906	500,000
The International Cobalt and Silver Mining Company, Limited.	Sault Ste. Marie.	September 19, 1906	500,000

Mining Companies Incorporated 1906.—Continued

Name of Company.	Head Office.	Date of Incorporation.	Capital. \$
The Interprovincial Mining Company, Limited.....	Haileybury.....	August 31, 1906.....	1,500,000
The Jessie Fraser Copper Mining Company, Limited.....	Niagara Falls.....	January 26, 1906.....	250,000
The Jury Copper Mines, Limited.....	Sault Ste. Marie.....	December 5, 1906.....	1,000,000
The Kerr Lake Lawson Mining Company, Limited.....	Cobalt.....	November 16, 1906.....	1,500,000
The Lake Abitibi Gold Mining Company, Limited.....	Toronto.....	December 19, 1906.....	200,000
The Lawson Cobalt Silver Mining Company, Limited.....	Eganville.....	May 12, 1906.....	500,000
The Lorrain Mining Company, Limited.....	Toronto.....	November 7, 1906.....	400,000
The Lumsden Mining Company, Limited.....	Toronto.....	December 14, 1906.....	1,000,000
The McKinley-Barragh-Savage Mines of Cobalt, Limited.....	Toronto.....	April 17, 1906.....	2,500,000
The Manhattan Cobalt Mining Company, Limited.....	Toronto.....	November 2, 1906.....	100,000
The Manufacturers Natural Gas Company, Limited.....	Hamilton.....	June 13, 1906.....	200,000
The Mining and Lands Development Company Limited.....	Toronto.....	April 17, 1906.....	40,000
The Montreal River Silver Syndicate, Limited.....	Toronto.....	April 24, 1906.....	200,000
The Nancy Helen Mines, Limited.....	Cobalt.....	October 3, 1906.....	500,000
The National Cobalt Silver Mining Company, Limited.....	Ottawa.....	December 21, 1906.....	1,000,000
The National Mining and Development Company, Limited.....	New Liskeard.....	August 24, 1906.....	40,000
The Nepigon Mines Company, Limited.....	Toronto.....	December 5, 1906.....	5,000,000
The New System Brick Company, Limited.....	Brantford.....	January 17, 1906.....	50,000
The New York Cobalt Silver Mines, Limited.....	Toronto.....	October 26, 1906.....	1,000,000
The North American Cobalt Refining Company, Limited.....	Hamilton.....	February 28, 1906.....	1,000,000
The Northern Ontario Consolidated Copper Company, Limited.....	Sault Ste. Marie.....	October 17, 1906.....	1,500,000
The Northern Ontario Copper Mining Company, Limited.....	Sault Ste. Marie.....	January 17, 1906.....	500,000
The Norwalk Mining Company, Limited.....	Sault Ste. Marie.....	March 2, 1906.....	300,000
The Odo Cobalt Mining Company, Limited.....	Haileybury.....	May 3, 1906.....	60,000
The Old Chap Mining Company, Limited.....	Cobalt.....	November 16, 1906.....	1,000,000
The Ontario Nickel Company, Limited.....	Worthington.....	October 5, 1906.....	1,000,000
The Ontario Oil and Refining Company, Limited.....	Chatham.....	August 31, 1906.....	100,000
The Ontario Sewer Pipe Company, Limited.....	Toronto.....	January 12, 1906.....	300,000
The Ottawa Cobalt Silver Mining Company, Limited.....	Ottawa.....	September 19, 1906.....	250,000
The Owen Sound Brick Company, Limited.....	Owen Sound.....	March 30, 1906.....	40,000
The Pontiac and Nipissing Exploration Company, Limited.....	New Liskeard.....	December 19, 1906.....	1,000,000
The Port Arthur and Lime Brick Company, Limited.....	Port Arthur.....	March 28, 1906.....	60,000
The Progress Cobalt Silver Mining Company, Limited.....	Cobalt.....	September 19, 1906.....	500,000
The Queen City Mining and Development Company, Limited.....	Toronto.....	February 28, 1906.....	150,000
The Red Rock Silver Mining Company, Limited.....	Haileybury.....	March 2, 1906.....	1,000,000
The Renfrew Brick and Tile Manufacturing Company, Limited.....	Renfrew.....	June 22, 1906.....	20,000
The Right of Way Mining Company, Limited.....	Ottawa.....	July 13, 1906.....	500,000
The Rochester Cobalt Mines, Limited.....	Cobalt.....	October 26, 1906.....	1,000,000
The Ross Cobalt Silver Mines Company, Limited.....	Cobalt.....	November 21, 1906.....	1,500,000
The Ruby Silver Mining and Development Company, Limited.....	Hamilton.....	November 9, 1906.....	500,000
The Russell Brick and Tile Company, Limited.....	Russell.....	December 19, 1906.....	100,000
The St. Paul Cobalt Mining Company Limited.....	Cobalt.....	November 28, 1906.....	600,000
The Savage Mine of Cobalt, Limited.....	Toronto.....	February 11, 1906.....	500,000
The Shakespeare Development Company, Limited.....	Sault Ste. Marie.....	March 14, 1906.....	300,000
The Sharpe Lake Cobalt Silver Mining Company, Limited.....	Ottawa.....	December 28, 1906.....	1,600,000
The Silverado Cobalt Mines, Limited.....	Cobalt.....	December 7, 1906.....	1,500,000
The Silver Bell Mining Company, Limited.....	North Bay.....	April 6, 1906.....	250,000
The Silver City Mining Company, Limited.....	Toronto.....	March 21, 1906.....	350,000
The Silver Cliff Mining Company, Limited.....	Ottawa.....	April 17, 1906.....	2,000,000
The Silver Crown Mining Company, Limited.....	North Bay.....	May 3, 1906.....	500,000
The Silverland Development Company, Limited.....	Toronto.....	March 26, 1906.....	1,600,000
The Silver Leaf Mining Company, Limited.....	Toronto.....	February 14, 1906.....	5,000,000
The Silver Lion Mining and Development Company, Limited.....	Cobalt.....	October 5, 1906.....	500,000
The Silver Star Mining Company, Limited.....	New Liskeard.....	February 19, 1906.....	40,000
The Soo Cobalt Mining Company, Limited.....	Cobalt.....	May 18, 1906.....	50,000
The South American Petroleum Company, Limited.....	Toronto.....	January 10, 1906.....	1,600,000
The Southern Belle Cobalt Silver Mining Company, Limited.....	Cobalt.....	November 24, 1906.....	1,000,000
The Steep Rock Development Company, Limited.....	Fort Frances.....	April 6, 1906.....	150,000
The Sudbury Cobalt Mining Company, Limited.....	Sudbury.....	April 27, 1906.....	300,000
Tarentorus Mining Company, Limited.....	Sault Ste. Marie.....	March 2, 1906.....	700,000
Temagami Iron Mining Company, Limited.....	Toronto.....	February 28, 1906.....	40,000
Temiskaming Hematite Iron Company, Limited.....	Toronto.....	January 17, 1906.....	150,000
Temiskaming Sterling Mining Company, Limited.....	Milberta.....	September 14, 1906.....	42,000
The Temagami Silver Mining Company, Limited.....	Sturgeon Falls.....	November 16, 1906.....	2,500,000
Temiskaming Mining Company, Limited.....	Toronto.....	April 6, 1906.....	40,000
The Terra Cotta Pressed Brick Company, Limited.....	Toronto.....	February 21, 1906.....	60,000
The Terrill Cobalt Mining Company, Limited.....	Sault Ste. Marie.....	December 27, 1905.....	100,000
The Thorold Natural Gas Company, Limited.....	Toronto.....	December 22, 1905.....	40,000
The Trout Lake Cobalt Mining Company of Montreal, Limited.....	Ottawa.....	December 10, 1906.....	3,000,000
The Twin Lake Mining Company, Limited.....	New Liskeard.....	August 24, 1906.....	500,000
The Two Lakes Copper Mining Company, Limited.....	Sowerby.....	October 12, 1906.....	500,000
The University Mines, Limited.....	Toronto.....	May 3, 1906.....	1,000,000
The Violet Mining Company, Limited.....	Toronto.....	August 3, 1906.....	250,000
The Wabi Cobalt Silver Mining Company, Limited.....	Cobalt.....	June 27, 1906.....	500,000
The Waterloo Mining Company, Limited.....	Berlin.....	October 12, 1906.....	200,000
The Wendigo Progressive Mining and Development Company, Limited.....	New Liskeard.....	December 27, 1905.....	40,000
The Wet Process Reduction Company, Limited.....	Toronto.....	October 12, 1906.....	1,000,000
The White Lily Mining and Milling Company, Limited.....	Fort William.....	December 21, 1906.....	1,000,000

Mining Companies Incorporated, 1906.—Continued

Name of Company.	Head Office.	Date of Incorporation.	Capital. \$
The Williams Copper Mining Company, Limited.....	Toronto.....	September 7, 1906.....	100,000
The Williamson-Marks Mines, Limited.....	Toronto.....	February 21, 1906.....	300,000
The Youngstown-Cobalt Silver Mining Company, Limited.....	Cobalt.....	December 28, 1906.....	1,000,000
Trethewey Silver Cobalt Mine, Limited.....	Toronto.....	May 30, 1906.....	1,000,000
United Mines of Cobalt, Limited.....	Toronto.....	September 5, 1906.....	1,000,000
United Silver Company, Limited.....	Cobalt.....	October 26, 1906.....	1,000,000
United States Cobalt Company, Limited.....	Toronto.....	December 7, 1906.....	3,000,000
Vermilion River Ore Company, Limited.....	Toronto.....	December 20, 1906.....	80,000
Victoria Silver Cobalt Mines, Limited.....	Toronto.....	November 2, 1906.....	1,000,000
Wainfleet Natural Gas Company, Limited.....	Port Colborne.....	January 17, 1906.....	100,000
Watts Mines, Limited.....	Toronto.....	October 12, 1906.....	1,000,000
Wendigon Silver and Copper Mining Company, Limited.....	Windsor.....	May 16, 1906.....	400,000
Wolst-Rees Cobalt Silver Mining Company, Limited.....	Windsor.....	May 7, 1906.....	250,000
Wonderland Silver Mining Company, Limited.....	Windsor.....	March 21, 1906.....	250,000
Wright Silver Mining Company, Limited.....	Toronto.....	August 15, 1906.....	200,000
Zone Consolidated Oil Company, Limited.....	Thamesville.....	December 28, 1906.....	40,000

Mining Companies Licensed, 1906

Name of Company.	Head Office.	Date of Incorporation.	Capital. \$
Acme Oil Company.....	Leamington.....	February 2, 1906.....	1,000,000
Amalgamated Silver Mines Company.....	Port Arthur.....	October 12, 1906.....	1,000,000
Arbor Oil Company.....	Chatham.....	December 28, 1906.....	50,000
Arizona Cobalt Silver Company.....	Toronto.....	May 28, 1906.....	1,000,000
Chicago Cobalt-Silver Mining Company, Limited.....	Toronto.....	December 10, 1906.....	500,000
Commonwealth Jewel Oil Company.....	East Tilbury.....	September 7, 1906.....	40,000
Kerry Mining Company.....	Woodstock.....	September 26, 1906.....	5,000
Lake Huron Company.....	Ottawa.....	August 15, 1906.....	100,000
Manitou Mines Company, Limited.....	Waldgeon.....	June 6, 1906.....	40,000
Northern Pyrites Company.....	Toronto.....	August 21, 1906.....	100,000
Olympia Gold Mining Company, Limited.....	Toronto.....	October 26, 1906.....	40,000
Stanley Smelting Works.....	Bannockburn.....	December 5, 1906.....	40,000
The Braddock Development Company, Limited.....	Michipicoten River.....	August 24, 1906.....	5,000
The Can-Amir Mining and Developing Company.....	Niagara Falls.....	October 12, 1906.....	500,000
The Consolidated Mining and Smelting Company of Canada, Limited.....	Toronto.....	April 17, 1906.....	5,500,000
The Ontario Oil and Gas Company.....	Chatham.....	December 12, 1906.....	15,000
Verona Mining Company.....	Kingston.....	July 18, 1906.....	1,000
Western Oil and Coal Consolidated.....	Toronto.....	November 16, 1906.....	100,000

Diamond Drills

The Sullivan "S" diamond drill was placed at the disposal of Mr. S. D. Maddin in August 1906 to prospect the north part of the southwest quarter of lot 2 in the fifth concession of Coleman township. On this location one hole was put down to a depth of 123 feet, mainly, as reported by manager E. K. Roche, in diabase. The gross cost of the boring was \$598.96, or \$4.87 per foot; the net cost, after debiting 35 per cent. of the expense to the Department as provided by the Regulations, was \$389.30, or \$3.17 per foot. The gross cost of diamonds was \$210.80, or per foot \$1.71.

In September the "S" drill was removed to the south half of the northwest quarter of the north half of lot 3 in the sixth concession of Coleman township, where drilling operations were to be carried on for Mr. R. H. C. Browne and associates under the supervision of Mr. S. D. Maddin. The ground proved difficult drilling. A heavy covering of drift overlay the rock, and after penetrating gravel, clay and hard pan to a depth of 51 feet and blasting numerous boulders, a bed of loose broken rocks was encountered through which it was impossible to force the casing pipe, especially as the bore hole was found to be going down on the dip of the rock instead of against it. This hole was thereupon abandoned and prospect number 2 was with considerable difficulty put down to a depth of 166 feet, solid conglomerate being encountered at 66

feet. Loose ground was met with at 68 feet and at successive depths until the hole bottomed in broken ground, the rock being conglomerate throughout.

The total cost was \$2,584.91, or per foot of drilling \$11.91, the net cost \$1,680.19 or \$7.74 per foot. The gross cost of diamonds was \$605.33, or \$2.19 per foot for the depth bored.

The expense of this operation was very greatly increased by the difficulty in reaching the solid ledge.

Mining Accidents

There were 11 men killed in mining accidents in 1906, two more than in 1905. Five men were seriously, and eleven others slightly injured, the total number of casualties being 25, involving 27 men. The causes of the fatalities were as follows: caught in slack of descending cable, 2; electric shock, 1; explosion of furnace, 1; falling down shaft, 2; run over by locomotive, 1; fall of timber in stope, 1; fall of car down shaft, 1; caught by descending cage, 1; unexpected explosion of dynamite, 1. Five of the men who were killed received their injuries above ground, and six below ground.

Algoma Steel Company

William Ault, employed as coke car man in the blast furnace department of the Algoma Steel Company's works at Sault Ste. Marie was killed on 10th January 1906, by an explosion which occurred in No. 2 furnace. A heavy slip took place in the latter causing the top to blow off, and a piece of flying material struck Ault on the head, killing him almost instantly. Coroner Dr. J. McLurg held an inquest on the evening of January 12th, the verdict of the jury being one of accidental death in accordance with the foregoing facts, and stating that no blame was attached to any one. Ault was 250 feet away from the furnace attending to his ordinary duties when the explosion took place. The superintendent, Mr. Sweetzer, had examined the furnace at 10.29 a.m., finding the temperature and pressure normal. At 10.30 a.m., one minute later, the explosion occurred. The coroner's theory is that an arch was formed in the stack by the charge failing to descend properly, and that the space beneath was filled with gas at a high pressure. When the arch suddenly gave way the gas could not find sufficient escape by the safety door, and hence relieved the pressure by expelling the upper part of the furnace outwards.

Helen Iron Mine

A number of minor accidents were reported to the Bureau during the year, the particulars of which are given in the table. Three fatalities occurred. On August 15th one of the drill men at the Helen mine, named Ed. Powers, met his death by falling through No. 2 shaft from the second to the third level. No inquest was held, as the manager of the mine stated it would have been impossible to keep the body the four days necessary for the coroner to reach the scene of the accident from Sault Ste. Marie. From the account of the fatality given by the superintendent of the mine it would appear that blame does not attach to anyone.

On 17th September the head pump-man, James Newell, met his death. Newell had entered the cage at the surface to go to the third level, but when he reached the latter he signalled to be hoisted to the second; while rising to the latter an empty car was actually pushed by the lander, Contardo, into the shaft. The car fell on the cage, crushing through the protection roof. Newell received the blow on the back of his head, the impact breaking in his skull and knocking his body out of the cage into the sump beneath, where it was found by grappling. Coroner McLurg held an inquest, the verdict of the jury being to the effect that the accident had been caused by the carelessness of lander Contardo and chute tender Redmond.

The third fatal accident was that which caused the death of Jani Walli, a Finlander who sat down to rest on the "divider," at the landing place on the fourth level, while coming up the shaft at noon, 22nd November. Part of his body projected into the shaft, and the cage descending caught him in the back and crushed him so severely that he died next day. The statements of the men who were on the platform at the time with Walli show that they had left work before the noon hour had arrived, and were waiting on the platform for the whistle to blow. They were aware that the cage was being used in the shaft, and it would seem that the unfortunate man placed himself in a position of great danger without thought of the possible consequences.

Canadian Copper Company

An electrician named H. E. Jackson, employed by the above company at Copper Cliff, met his death on 12th January 1906. He was connecting lights in the switch board room of the new power house, and attempting to cut a charged wire was instantly killed. Everything possible was done in the hope of reviving the unfortunate man, but without avail. The coroner was notified, and decided that an inquest was unnecessary.

On 20th June a Finlander laborer named Rusta Stanros (or Stenaras) while attempting to get on the foot-board of a locomotive which was backing up after having been connected with two cars loaded with rock, missed his footing, fell on the rails and was immediately killed. At the company's request Coroner Oliver held an inquest. The jury returned a verdict of death through misadventure.

In the course of making some alterations in the hoisting apparatus at No. 2 mine, two Finlanders named Matti Vaysi (also written Warri) and Frank Salo, the former a trammer and the latter a drill runner, were killed under the following circumstances: The hoist cable, a wire rope one inch in diameter, 425 feet long, and weighing one and a half pounds per foot, was taken up for part of the way, the "slack" being drawn out through a side door in the covering of the skipway at the collar of the shaft; this left 350 or 400 feet of cable dangling in the shaft below, the upper portion being clamped at the knuckle of the shaft, as it was thought, quite securely. Suddenly and without warning that part of the rope hanging in the shaft began running through the clamp that was holding it, and the jerk of the rope knocked down several men, throwing Vaysi and Salo forward on the skip tracks with great force. They both received injuries from which they died in the hospital, the former after six hours and the latter after twenty-four hours. Coroner Oliver decided that an inquest was required, and accordingly a jury was empanelled, which after hearing the evidence, rendered the following verdict: "We, the jury, find that Matti Vaysi and Frank Salo came to their death through an accident, the clamp giving way and the cable slipping through and throwing them on the skip track." The cable was covered with grease, and no doubt the weight of the rope overcame the pressure of the clamp, but the jury's verdict did not place censure upon any one.

Bannockburn Pyrites Mine

While riding in a bucket at the Bannockburn pyrites mine, the property of the American Madoc Mining Company, on 3rd April, Peter Jarvis, underground shift boss, fell down the shaft seventy or seventy-five feet and was instantly killed. A jury was empanelled by Dr. W. S. Harper of Madoc, coroner, and an investigation held, at which Mr. E. T. Corkill, Inspector of Mines, was present. The evidence showed that deceased and four other men were ascending in the bucket, when the latter got outside the guard rail, and Jarvis was precipitated down the shaft. Another of the men also fell, but about 20 feet down was stopped by a timber. The others caught the ladder when the bucket struck and came to the surface. The miners knew it was against the regulations to ride in the bucket, and had read the notice at the shaft top forbidding the practice. Notwithstanding this, the ladderways, though in good condition, were but little used in

coming up out of the mine, the prevailing custom being to ride up in the bucket. The verdict of the jury was that the company was not responsible for the death of deceased, as he himself being underground foreman should have lived up to and enforced the rules of the company, which as well as the provisions of the Mines Act, prohibit the use of the bucket for raising or lowering men.

Nipissing Mine

Ankusti Polvi, a Finlander who had previously worked at Copper Cliff, was fatally injured on 6th August by the falling of a timber at what is known as ledge number six, Nipissing silver mine. The accident took place at 5.30, and Polvi was taken to the hospital at Cobalt, where he died at 10.30, from fracture of the skull. Dr. H. R. Codd of Haileybury, coroner, was notified, but after investigating the circumstances, concluded an inquest was unnecessary. The stull which fell and caused Polvi's death had been in position for eight or nine months and had at various times sustained great weight. Deceased had just fired a round of machine holes, and it is supposed a heavy stone must have struck the stull, loosening it and leaving it in position to fall.

O'Brien Silver Mine

A piece of rock fell out of an over-loaded ore bucket in the O'Brien mine on 23rd August, and struck a miner named William Dyer on the head, injuring him somewhat seriously. He was taken to St. Michael's hospital at Toronto, where he was treated for his injuries, a portion of the skull being removed. He was able to leave the hospital in about three weeks, to all appearances perfectly well.

Mitchell Prospect

At the Mitchell silver prospect near Haileybury on 24th November, Joseph Couture, drill runner and shift boss, suffered a compound fracture of the leg by being struck while descending the shaft in the bucket, the blow being inflicted by an empty car which fell down after him. Vibration of the machinery or a strong south wind, or both together, are said to have started the car from its place on the track towards the mouth of the shaft. On 7th December he was reported progressing favorably towards recovery.

Kerr Lake Silver Mine

Two miners named respectively Geo. Rush and E. Girouard, on 4th December drilled into a "missed hole" in the Kerr Lake (Jacobs) mine, exploding the remnant of the old charge and severely injuring the men. Rush died of his wounds the following day, and an inquest was held by Dr. Codd of Haileybury. The jury found the occurrence to be entirely accidental, and exonerated all persons other than deceased from blame. Girouard, the other injured man, was sent to Montreal for treatment, and in the end lost the sight of both eyes.

Victoria Mines

On 11th December Eugene Orassi, an Italian, employed by the Mond Nickel Company, was injured about the head and face by an explosion while placing a charge of dynamite in a bed of roasted ore. The injury was chiefly to the sight of one eye. The ore that was being blasted had been cooled off by snow and cold water. The explosion took place while tamping the cap.

Another employee, named Louis Kasskulon, was badly burned on the legs and arms December 21st by the explosion of a pot of slag while dumping it on the ground. He was taken to the hospital in Sudbury, and the doctor reported that although his life was not in danger, he would be laid up for some weeks.

A table is appended giving a summary of the accidents, their nature, causes, etc.

Table of Mining Accidents, 1906

No.	Date.	Mine or Works.	Name of Injured Person.	Result of Injury.			Nature of Injury.	Cause of accident.
				Slight.	Severes.	Fatal.		
						Above ground.	Below ground.	
1.	Jan. 12	Canadian Copper Co.	H. E. Jackson			1	1	Electric shock.
2.	" 13	Algoma Steel Co.	William Ault			1	1	Explosion of furnace.
3.	Feb. 6	" "	Guiseppi Vignuda	1				Fall of ore.
4.	" 9	" "	Alex. Koskeia	1			1	Fell down shaft.
5.	April 3	American Madoc Mining Co.	Peter Jarvis	1				Fell down shaft.
6.	" 10	" "	Thomas Shea	1			1	Caught in winch gear.
7.	" 16	" "	James Newell	1				Caught in machinery.
8.	" 20	" "	Kusta Stamos	1			1	Ran over by locomotive.
9.	" 26	" "	James Keenan	1			1	Fall of piece of iron.
10.	July 24	Canadian Copper Co.	John Ojampere	1			1	Explosion of powder.
11.	Aug. 6	" "	Andrew Polvi	1			1	Fell down shaft.
12.	" 15	Nipissing silver mine	Ed. Powers	1			1	Fell down shaft.
13.	" 23	" "	William Dwyer	1			1	Fell down shaft.
14.	Sept. 13	O'Brien silver mine	Myro Toborsky	1			1	Explosion of powder.
15.	" 17	" "	James Newell	1			1	Fell down shaft.
16.	" 26	" "	Sam. R. Hanna	1			1	Fell down shaft.
17.	" "	" "	Alfred Kelly	1			1	Fell down shaft.
18.	Nov. 17	" "	Patrick Nevilles	1			1	Fell down shaft.
19.	" 22	" "	John Walli	1			1	Chandelstick ran through hand.
20.	" 24	" "	Joseph Couture	1			1	Fell down shaft.
21.	" 29	" "	Victor Sannet	1			1	Premature explosion of dynamite.
22.	Dec. 3	" "	(Matt Vaisi (or Warr))	1			1	Caught by descending cage.
		" "	Frank Selo	1			1	Fell of car down shaft.
		" "	Geo. Rush	1			1	Struck by door suddenly forced open.
23.	" 4	Kerr Lake Mining Co.	E. Gironard	1			1	Caught in slack of descending cable.
24.	" 11	Victoria Mines	Engene Grassl	1			1	Drilled into misexploded dynamite.
25.	" 21	Victoria Mines	Louis Kasskulton	1			1	Explosion of dynamite in roasted ore.
				1			1	Explosion of slag.
Total casualties				11	5	10	17	

The Mining Divisions

The amendments to the Mines Act in 1906 have worked a radical change in the method of administering the mining lands of the Crown. Formerly, all applications for such lands were made direct to the Department of Crown Lands (now the Department of Lands, Forests and Mines), at Toronto, where they were passed upon and dealt with. Delays were found inevitably connected with correspondence carried on at a distance, arising sometimes from misunderstanding or ignorance of the law, sometimes from lack of precision or carefulness in describing the lands applied for, and sometimes from other causes; and in times of "boom" or excitement caused by discovery of promising or valuable mineral deposits, the difficulties attendant upon this method of transacting business were aggravated. By providing for the parcelling out of the mineral regions of the Province into Mining Divisions and placing each Division in charge of an officer who should live on the spot, receive applications and deal with them so far as possible definitely without reference to the Department at Toronto, it was hoped to inaugurate a system which would be of great convenience to the public at large, and especially to prospectors and others interested in the taking up of Crown lands for mining purposes. Mining Divisions, it may be said, were not new to the Act of 1906, authority for their establishment having been first included in the law of 1868, and having remained there ever since. This feature, however, had been but little availed of. An exception was the creation of the Michipicoten Mining Division in 1898, following upon the discoveries of gold and iron there shortly before. The Temiskaming Mining Division set apart in April 1905 was established under the provisions of the Mines Act as it then was, and the facilities thus afforded for the speedy dealing with applications for mining lands during the excitement consequent upon the rich finds of silver and cobalt in the township of Coleman, indicated that a localized, rather than a centralized, method of administration was suited to the needs of the case.

This principle of decentralization was extended by the amendments of 1906, and Mining Recorder's offices have been established at Sudbury, Sault Ste. Marie, Port Arthur, Kenora, Parry Sound, Larder Lake and Latchford, in addition to those already in existence at Haileybury and Cobalt. A list of these Divisions with the date of the Order in Council establishing them, and the name and address of the Recorder in charge is here appended:

List of Mining Divisions

Mining Divisions.	Date of Order-in-Council.	Name of Recorder.	Address.
Temiskaming	5th April, 1905.....	George T. Smith	Haileybury.
Coleman	14th May, 1906.....	T. A. McArthur	Cobalt.
Sudbury	28th May, 1906.....	F. F. Lemieux	Sudbury.
Sault Ste. Marie	28th May, 1906.....	S. T. Bowker	Sault Ste. Marie.
Port Arthur.....	28th May, 1906.....	J. W. Morgan	Port Arthur.
Kenora	28th May, 1906.....	C. W. Belyea	Kenora.
Fort Frances.....	28th May, 1906.....	Deputy Minister of Mines	Toronto.
Parry Sound.....	26th September, 1906.....	H. F. McQuire	Parry Sound.
Larder Lake.....	15th May, 1907.....	J. A. Hough	Larder Lake.
Montreal River.....	8th May, 1907.....	A. Macphail	Latchford.
Temagami Forest Reserve	20th June, 1906.....	Deputy Minister of Mines	Toronto.
Mississauga Forest Reserve	23rd June, 1906.....	do do	Do.

Temiskaming

The Temiskaming Mining Division was the first to be created, and for a considerable time all the claims staked out in the Cobalt area were recorded at the head office of the Division at Haileybury.

Its original boundaries were as follows:

Commencing at a point on the west shore of lake Temiskaming, in the District of Nipissing, where the same is intersected by the line between concessions numbers three and four in the township of Lorrain, half a mile south of Old Fort Temiskaming; thence following along the shore of said lake northwesterly and northeasterly to where the same is intersected by the inter-provincial boundary between the Provinces of Ontario and Quebec; thence due north astronomically along said boundary seventy miles more or less to where the same is intersected by the southerly shore of Upper Lake Abitibi; thence westerly, northerly and northwesterly along the southern and western shores of Upper Lake Abitibi and Lower Lake Abitibi to an iron post one and one-quarter inches in diameter planted alongside a black ash post six inches square on the west shore of Lower Lake Abitibi, about eight miles north of the outlet of said lake, which post was planted in 1904 by Ontario Land Surveyor William Galbraith on his base line run in that year, and marked "XLII M;" thence due west astronomically along said base line to the northeast angle of the township of Moody; thence due west astronomically along the north boundaries of the townships of Moody, Wesley, Edwards, Aurora, Newmarket and Mann, a distance of forty-two miles nine chains and fifty links, more or less, to the one hundred and fiftieth mile post on the boundary between the districts of Nipissing and Algoma, as run by Ontario Land Surveyor Alexander Niven; thence due south astronomically along said district boundary, being the west boundaries of the townships of Mann, Little, Evelyn, Matheson, Cody, Carman and Langmuir to the southwest angle of the township of Langmuir, a distance of forty-two miles; thence due east astronomically along the south boundaries of the townships of Langmuir, Blackstock and Timmins, a distance of fifteen miles, more or less, to the portage on the canoe route between the Great Northern Bend on the Montreal river and Night Hawk lake; thence southerly along said portage route south to the Great Northern Bend on the Montreal river; thence southeasterly along the easterly bank of the Montreal river, and along the east shore of the lake expansions thereon to where the same is intersected by the southerly limit of lot number eleven in the third concession of the township of Coleman; thence north fifty-five degrees and thirty-five minutes east astronomically along the southern boundary of the township of Coleman, a distance of two hundred and fifty chains, more or less to the northeast angle of the Booth and Lumsden timber-berth; thence southeasterly along the east boundary of said timber berth to where the same is intersected by the line between the third and fourth concessions of the township of Lorrain; thence due east astronomically along said concession line a distance of five miles, more or less, to the water's edge of lake Temiskaming, or place of beginning.

Out of the foregoing territory the Coleman Special Mining Division and the Larder Lake Mining Division have been set apart as separate Divisions, as described below.

Reports up to the 31st December 1906 which have been received from Mining Recorders follow the descriptions of the several Divisions.

Coleman

The township of Coleman, within whose limits is comprised the greater part of what has come to be known as the Cobalt silver field, was for purposes of the Mines Act detached from the Temiskaming Mining Division, of which it had formerly been part, and constituted a separate Mining Division by Order in Council of 30th October, 1905. One effect of this separation was to reduce the size of mining claims in Coleman to 20 acres, the area in ordinary Divisions being 40 acres, or 20 chains square. For some time the affairs of both Mining Divisions were under the sole charge of Mr. George T. Smith, Haileybury, Recorder of the Temiskaming Division, but with the view of affording greater local facilities for the transaction of the business arising in this very active mining camp, a separate office for Coleman was opened at Cobalt, and Mr. T. A. McArthur appointed Assistant Recorder in charge, July 27, 1906.

Mr. McArthur, Mining Recorder, writes:

"I beg to make a brief report as follows:

"Office opened, 21st September, 1906.

"Miners' Licenses issued, 249.

"Number of applications for mining claims received and recorded, 154.

"Number of applications for working Permits received and recorded, 166.

"Total fees collected and remitted, \$3,975.50.

"The shipping mines are in almost every case increasing their monthly output.

"A very considerable amount of prospecting and development work has been done in the southeast quarter of the township, as a result of which several shipping properties have been opened up in concessions three and four, southeast of Kerr lake. Blind veins have been discovered in this section of the township at a depth of 50 and 75 feet.

"The western, or Portage Bay, portion of the township has developed several properties which promise to be numbered among the shippers at an early date. Lots 15, 16 and 17 in the fifth concession, and lot 15 in the sixth concession are showing up well, and give every evidence of adding to the list of shipping mines.

"The opening of the recording office at Cobalt has been a great convenience to prospectors in the matter of filing claims and doing other business which comes within the jurisdiction of this office."

Sudbury

The Sudbury Mining Division includes the following territory:

Commencing at the junction of the Mattawan river with the Ottawa river, near the town of Mattawa, thence westerly along the southerly boundary of the townships of Mattawan, Orlig, Phelps and Widdifield to lake Nipissing, thence across lake Nipissing in a direct line to the Chaudiere Falls at the outlet of said lake; thence down the French river, following the channel, forming the boundary between the Districts of Nipissing and Parry Sound to lake Huron; thence along the north shore of lake Huron to the southeast corner of the township of Long; thence due north astronomically, along the eastern boundary of the townships of Long, McGivern and townships Nos. 155, 156, and 157, a distance of twenty-nine miles, more or less to the northeast corner of township No. 157; thence due east astronomically along the southerly limit of the Mississauga Forest Reserve along the northerly limit of townships 151, 145, 139, 132, 125 and 120 to the southwest angle of township No. 114; thence due north astronomically along the western limit of townships Nos. 114 and 115 and along a meridian line run due north astronomically from the northwest angle of township No. 115, in all a distance of twenty-four miles, more or less to where the same is intersected by O.L.S. Proudfoot's base line; thence due west astronomically 30 miles, more or less to the 12th mile post on O.L.S. Alexander Niven's base line run in 1902; thence due north astronomically along said meridian line thirty-seven miles, more or less to where the same intersects the northern limit of the right-of-way of the Canadian Pacific railway at a point about two miles east of Woman River station; thence northwesterly along the northerly limit of said right-of-way to the point where the same is intersected by the boundary between the Districts of Algoma and Thunder Bay, which point is near White River station; thence due north astronomically along said District boundary to the Albany river; thence down the Albany river along the boundary line between the Province of Ontario and District of Keewatin to Fort Albany on James Bay; thence southeasterly along the southwesterly shore of James Bay to the boundary between the Districts of Nipissing and Algoma; thence due south astronomically along said district boundary a distance of twenty-two miles, more or less, to where the same is intersected by the southerly bank of Moose river; thence southwesterly up stream along the southerly bank of said river to its junction with the Mattagami river; thence southerly along the easterly bank of the Mattagami river to its junction with the Groundhog river; thence southerly along the easterly bank of the Groundhog river to where the same is intersected by the

base line run by O.L.S. Alexander Niven in 1900 in latitude 49 degrees 35 minutes and 30 seconds north; thence due east astronomically along said base line three miles, more or less, to the meridian line run by O.L.S. T. B. Speight and Alexander Niven in 1905; thence due south along said meridian line and its production south a distance of seventy-eight miles to the 36th mile post on the base line run by O.L.S. Alexander Niven in 1899, in latitude 48 degrees, 27 minutes, 54 seconds north; thence due east astronomically along said base line a distance of 20 miles more or less to where the same is intersected by the eastern bank of the Mattagami river, forming the westerly boundary of the Temagami Forest Reserve; thence southerly upstream along the easterly bank of the Mattagami river and along the easterly shore of the several lake expansions thereon, forming the western limit of said Forest Reserve to the portage on the height of land at the north end of Meteor lake; thence across said portage and southerly along the easterly shore of Meteor lake and along the several small portages and along the easterly shore of several small lakes on the canoe route between Meteor lake and Long lake at the head waters of Wahnapiatae river; thence southerly along the easterly shore of Long lake, and south astronomically from the foot of Long lake to the 12th mile post on O.L.S. Proudfoot's base line; thence due east astronomically along said base line and its production due east astronomically 18 miles, more or less to the northeast angle of the township of Creelman; thence due south astronomically along the easterly limit of the said township of Creelman six miles more or less to the northwest angle of the township of Parkin; thence due east astronomically along the north limits of the townships of Parkin, Aylmer Mackelean and McCarthy to the northeast angle of the latter, in all a distance of twenty-five miles more or less; thence due south astronomically, along the easterly limit of the township of McCarthy, six miles more or less to the northwest angle of the township of McNish; thence due east astronomically along the northern limits of the townships of McNish, Pardo, Hobbs, McCallum, and along the said northern limit produced east astronomically to the west shore of lake Temiskaming, in all a distance of fifty-nine and three-quarter miles; thence due east astronomically to the inter-provincial boundary between the Province of Ontario and the Province of Quebec; thence southeasterly along said inter-provincial boundary passing through lake Temiskaming and down the Ottawa river to the place of beginning, near the town of Mattawa.

Mr. F. F. Lemieux, Recorder, reports as follows:

"This office was opened for business on the 23rd day of June, 1906.

"Miners' Licenses to the number of 128 have been issued.

"Applications for mining claims to the number of 126 have been filed, the great majority of which have been recorded.

"The total amount of fees collected and remitted to the Department is \$1,915.00, a small portion of which has been refunded to parties whose applications for mining claims have been rejected.

"The mining industry has taken a decided upward trend during the year in this Mining Division. Besides the usual large operations of the Canadian Copper Company and the Mond Nickel Company, a new company known as Moose Mountain, Limited, has commenced to lay out works of an extensive character in the township of Hutton, for the purpose of mining the large iron deposits in said township. This latter company has not commenced actual mining operations as yet, the work consisting of test-pitting, trenching, stripping and magnetic surveying, and the clearing of land and erection of buildings. The James Bay Railway Company is building a line to this property, the grading of which is practically completed, and it is expected that the railway company will be able to haul ore next summer, the Moose Mountain company expecting to commence actual mining operations in the coming spring.

"The Mond Nickel Company is opening up a nickel deposit in the township of Garson, which it is understood is to be worked extensively by the use of electric power from the Wahnapiatae Power Company, the line of transmission being now in course of

construction. This company intends to ship the roasted ore to their works at Victoria Mines for smelting and treatment.

"Considerable prospecting is going on in the townships of Springer, Dunnett and adjoining townships for copper, silver and iron, and many claims are being taken up.

"In the township of Porter and along the line of the Sault branch of the Canadian Pacific railway considerable activity is manifesting itself in numerous finds of copper.

"In the townships of Bowell and Wisner and adjoining territory iron is being found in large quantities and of good quality.

"The establishment of this office is filling a long felt want among mining men and prospectors, owing to its ready access and great convenience in the matter of filing claims and obtaining information near at hand regarding mining matters."

Sault Ste. Marie

The Sault Ste. Marie Mining Division comprises the following territory:

Commencing at the southwest angle of the township of Pic; thence east astronomically along the south limits thereof to the southeast angle; thence due north astronomically along the east limit thereof to the southerly limit of the right-of-way of the Canadian Pacific railway; thence easterly along the southerly limit of said right-of-way to the boundary between the Districts of Algoma and Thunder Bay; thence southerly along said boundary to the north shore of lake Superior; thence westerly and north-westerly along the shore of said lake to the place of beginning.

To include also Michipicoten Island and all islands in lake Superior lying south of the above described area; also being composed of that portion of the District of Algoma hereinafter described.

Commencing at a point on the north shore of lake Superior where the same is intersected by the boundary line between the Districts of Algoma and Thunder Bay; thence due north astronomically along said district boundary to the southerly limit of the right-of-way of the Canadian Pacific railway; thence southeasterly along the southerly limit of said right-of-way to a point on said right-of-way where the same is intersected by the northerly production of a meridian line by O.L.S. Alexander Niven in 1902, which point is about two miles east of Woman River station; thence due south astronomically along said meridian line nineteen miles more or less to the thirtieth mile post on said meridian line, which point marks the northeast angle of the Mississaga Forest Reserve; thence due west astronomically along the north limit of said Forest Reserve fifty-four miles to the northwest angle thereof; thence due south astronomically along the west limit of said Reserve thirty-six miles to the southeast angle of the township of Curtis; thence due east astronomically along the north limit of townships numbers 201 and 195 to the northeast angle of the latter; thence due south astronomically six miles to the northwest angle of township No. 188; thence due east astronomically along the north limit of townships Nos. 188, 182, 176, 169, 163 and 157 to the northeast angle of the latter, which line forms the southern limit of said Forest Reserve; thence due south astronomically along the east limit of townships Nos. 157, 156, 155, township of McGiverin and township of Long, a distance of twenty-nine miles, more or less to the water's edge of lake Huron, about two miles west of Cook's Mills; thence westerly and northerly along the north shore of said lake and along the east shore of lake George and along the north bank of the St. Mary's river to the town of Sault Ste. Marie; thence continuing along the north bank of said river and northerly and westerly along the east shore of lake Superior to the place of beginning.

To include also the Great Manitoulin group of islands and all islands in lake Huron north of said Manitoulin group and west of the southerly production of the east limit of the township of Rutherford to a point east of Cape Smith. To include also St. Joseph Island and islands in lake George and the St. Mary's river lying north of the international boundary, and islands in lake Superior lying east of the southerly

production of the boundary between the Districts of Algoma and Nipissing south of the international boundary, saving and excepting therefrom all the lands set apart and allotted to the Algoma Central Railway Company by Order-in-Council dated the 4th day of February, 1905, made under and by virtue of the Act passed in the sixty-third year of Her late Majesty's reign, chapter 30, entitled an Act respecting Aid by Land Grant to the Algoma Central Railway Company, such lands being colored green on the plan filed by the said company, and referred to in the aforesaid Order-in-Council, the same being as follows: The townships of Deroche, Hodgins, Gandette, the township of West Gaudette, locally known as Hamilton, township 23, range X, townships 24 and 25 in Range XII, and 24 in Range XIII, also townships 22 and 23 in Range XI and XII, the eastern part of the township of Archibald, townships 26 and 27 in Range XII, 25, 28 and 29 in Range XIII, 24, 25, 28 and 29 in Range XIV, 26 and 27 in Ranges XV and XVI, 24 and 25 in Ranges XVII and XVIII, 28 and 29 in Ranges XVII and XVIII, 26 and 27 in Ranges XIX and XX, 30 and 31 in Ranges XIX and XX, 28 and 29 in Ranges XXI and XXII, 26 and 27 in Ranges XXIII and XXIV and townships 28, 29, 30, 31, 32 and 33 in Ranges XXV and XXVI.

Mr. Sidney T. Bowker, Mining Recorder, writes:

"I beg to report as follows on the operations of my office during the year 1906:

"The Mining Recorder's Office was opened at Sault Ste. Marie, on the 7th day of August, 1906.

"The total number of mining licenses issued from this office up to December 31st, 1906, was 75.

"The total number of mining claims received and recorded up to December 31st, 1906, was 115.

"The total amount of fees collected and forwarded to the Department up to the 31st December, 1906, was \$1,393.50.

"I am very glad to report that the mining industry in my Division is progressing very favorably indeed. I have had a great many inquiries since I opened the office as to mining matters generally.

"Copper especially seems to be very active in this Division. The Northern Ontario Consolidated Copper Company, which is operating in the township of Thompson near Dean lake, appears to have struck a large body of exceptionally fine ore. I have seen samples of it weighing almost 100 pounds that will run nearly 15 per cent. copper. It is said they have a stock pile of about 2,000 tons, all good shipping ore. They have sunk a three-compartment shaft to a depth of 130 feet and are now crosscutting the vein. The reports I hear from this property are very favorable indeed.

"In the same vicinity, in the township of Patton, the Jury copper mines have been opened, and I understand they are already shipping ore.

"In the township of Cobden, about two miles from the property owned by The Northern Ontario, another good find was made late last fall, and I understand a company is being organized for the purpose of working it.

"There have also been one or two good finds reported on the Algoma Central railway, one by Frank Inglee. I have seen samples of this copper. It looks very good. It is Mr. Inglee's intention to start active development work in the spring.

"Another claim is that owned by the Cobden Mining Company. This has not been developed to any extent, but indications are very good for copper ore."

Port Arthur

The Port Arthur Mining Division includes the following territory:

(1) Commencing at the intersection of the boundary line between the Districts of Thunder Bay and Algoma with the north shore of lake Superior; thence north astronomically along said district boundary to the southerly limit of the right-of-way of the Canadian Pacific railway; thence westerly along the southerly limit of the said right-of-

way to the east boundary of the township of Pic; thence due south astronomically along said east boundary to the southeast angle thereof; thence due west astronomically along the southerly boundary of said township to the water's edge of lake Superior; thence southeasterly and easterly along the water's edge of said lake to the place of beginning, together with Michipicoten island and all islands in lake Superior lying south of the above described area.

(2) Also the township of Sibley set aside as a Forest Reserve.

Said Mining Division to include also within its limits all islands in lake Superior within the Province of Ontario lying west of a line drawn due south astronomically from the southwest angle of the township of Pic.

Mr. C. H. Shera was the Recorder appointed when the Division was established, but dying 24th November, 1906, his son Mr. W. L. Shera filled the position temporarily until the appointment of Mr. J. W. Morgan on 28th December following.

Mr. Morgan furnishes the following report:

"As I took over this office on January 1st, 1907, my report must be based entirely on such information as is contained in the books of this office, and on the opinions of the prospectors and mining men of this district.

"I have to report that this office was opened during the first week in August 1906, the first license was issued August 7th and the first claim was recorded August 13th. During the remainder of 1906 there were issued from this office forty-nine licenses, and forty-two claims have been recorded; \$599.70 was received, and \$520.00 remitted to the Bureau of Mines.

"Prior to the setting in of winter a considerable amount of prospecting had been done and some very valuable claims had been taken up. During winter very little has been done, the snow lying three or four feet deep, and the temperature frequently falling to thirty degrees below zero. I have not the slightest doubt that early spring will see a great deal of prospecting and actual mining development done in this district.

"Every mining man and prospector without exception speaks with the highest approval of the opening of a Mining Recorder's office in this town. Their reasons are:

(a) The avoidance of delays and additional expense in securing miner's licenses.

(b) Claims are recorded here and delay in commencing work is thus obviated.

(c) Disputes are much more easily settled.

(d) It is a very great convenience to have in this office for public inspection, maps and records in detail, so that a prospector can without delay ascertain what lands are open for staking out."

Kenora

The Kenora Mining Division was set apart with the following boundaries:

Commencing at a point on the boundary line between the districts of Rainy River and Thunder Bay where the same is intersected by a base line run by O.L.S. Thomas B. Speight in latitude 49 degrees 0 minutes 6 seconds north; thence due west astronomically along said base line 23 miles 71 chains 7 links to an iron post; thence continuing on the same course west astronomically 36 miles more or less to the 18th mile post on O.L.S. Niven's 5th meridian line; thence continuing on the same course west astronomically 30 miles more or less to the 18th mile post on O.L.S. Niven's 6th meridian line, thence continuing on the same course due west astronomically 35 miles more or less to the westerly shore of Clear Water lake; thence southerly along the westerly shore of said lake 10 chains, more or less, to the 49th parallel of latitude; thence due west along said parallel of latitude 32 miles more or less to the water's edge on the east shore of the Lake of the Woods; thence continuing due west astronomically along said parallel of latitude 14 miles, more or less, to where the same is intersected by the international boundary passing through the Lake of the Woods.

Mr. C. W. Belyea, Mining Recorder, reports as follows:

"Miner's licenses issued 9; amount paid, \$45.00.

"Number of mining claims recorded in this office on which fees were paid here 13; fees, \$77.50.

"Number of claims recorded in books of Department transferred to me, and fees paid into Department, 12.

"Total amount collected to December 31st, \$122.50.

"Total amount sent to Department for year ending December 31st, \$122.50.

"First license issued on 9th October, 1906.

"In the Lake of the Woods section of this mining district the work of development and mining has for the past year been of an intermittent and desultory character.

"On none of the well known properties that have been developed to any great extent has any important or progressive work been done. This is perhaps accountable for by lack of capital chiefly; as past years have fully demonstrated the richness of the ore bodies in and around Lake of the Woods. There are prospects, however, that the coming spring will see the opening up of the Golden Horn mine, the Combine mine, the Black Eagle or Regina, and the Sultana.

"From the Eagle lake district where the working properties of the Baden Powell Mining Company and The Northern Lights Mining Company and the Grace mine have been closed down during the winter, it is reported that work will be resumed this spring.

"Interest has been aroused by reports of large deposits of iron ore lying to the north and east of the route of the Transcontinental railway, but so far it has not been determined whether these deposits are of a valuable mercantile character or within reach of transportation facilities.

"The Manitou region merits separate mention from other parts of the District, it being in many ways isolated from the other belts that have been more or less worked, and also on account of the auriferous zone in which the work is being carried on differing in many respects from the general ore deposits of the district.

"The principal theme of interest in this district during the past year (1906) has been the Laurentian mine. The work that has been done on the property has been more in the nature of exposing the rich chute and crosscutting at the 200 foot level to the other parallel ore bodies, production being of secondary consideration, pending the organization of the operating company which is now organized and known as the Hugo von Hagen Exploration Company. The intention of this company, it is understood, is to commence aggressive work at once not only on the Laurentian, but on other properties which it has acquired in the same locality. The Von Hagen Company is capitalized at fifteen million dollars, par value of shares \$5.00 each.

"The Northern Development Company at their Paymaster mine (H. W. 20) have worked energetically during the whole year, several parties of the shareholders having visited the property during the year, one party from Detroit and vicinity, numbering thirty-five, having come at one time. At present the company is crosscutting at the 200-foot level, having delayed sinking on account of water, and now awaiting pumping machinery.

"The Summit Lake Gold Mining Company resumed work on their Little Master mine, but had the misfortune to have their engine house burnt. This building contained the compressor and hoisting plants, and therefore work had to be suspended. However, the company is making arrangements to instal a heavier plant.

"The Detola Mining and Development Company is a new organization of the past year. It owns mining location H. P. 411, on which a preliminary test shaft was sunk. Machinery is to be installed this coming season. The company is composed principally of Michigan and Ohio stockholders.

"The Manitou Mines Company, Limited, is another new organization composed of local men and parties in the State of New York. They commenced operations on McA 28,

known as the Victory mine. This property was the first location that had a fifty-foot shaft sunk on it in the Manitou country, which was done in 1896-7. Since then it has remained largely in a dormant condition, the shaft having been continued to the 100-foot level and some drifting and crosscutting done in 1897-8. This past summer the above company took hold of it under option and made further investigation, after which they built new camps and did a little surface work and straightened up the shaft, etc., ready for the installation of machinery in the spring. The company are now making preparations to put in at once a six-drill air compressor and hoist with two 60-h.p. boilers, and will then commence energetic mining work.

"The Minnehaha Mining and Smelting Company of Buffalo, N. Y., operating on mining locations S. V. 434 and 435, continued their shaft from the 50-foot level another fifty feet. The vein at that depth having widened and become more mineralized, their intention is to now erect camps and instal compressor plant and hoist, the work so far having been done by contract during the summer months. No buildings were put up, but now with the installation of machinery it is their intention to commence permanent operations with a practical superintendent in charge.

"Several properties, the leases of which were recently cancelled for the non-payment of rent, etc., have been acquired by new holders, and these parties are mostly all preparing for operations more or less extensive during the coming summer. Other properties have changed hands, and taking every thing into consideration, the outlook for the year 1907 is promising. With the fresh life that the foregoing work has instilled into the prospectors, and the general prosperity of the whole district, I look for a very active season in gold mining."

Mississaga Forest Reserve

The Mississaga Forest Reserve Mining Division comprises the whole of the Mississaga Forest Reserve through which the river of that name runs into lake Huron. It is subject to the Forest Reserve Regulations, and is administered by the Department at Toronto.

Fort Frances

The Fort Frances Division is described as follows:

Commencing at a point on the boundary line between the Districts of Rainy River and Thunder Bay where the same is intersected by a base line run by Thomas B. Speight, O. L. S., in latitude 49 degrees 0 minutes 6 seconds north; thence due west astronomically along said base line 23 miles 71 chains 7 links to an iron post; thence continuing on the same course west astronomically 36 miles more or less to the 18th mile post on Ontario Land Surveyor Niven's 5th meridian line; thence continuing on the same course west astronomically 30 miles more or less to the 18th mile post on Ontario Land Surveyor Niven's 6th meridian line; thence continuing on the same course due west astronomically 35 miles more or less to the westerly shore of Clear Water lake; thence southerly along the westerly shore of said lake 10 chains more or less to the 49th parallel of latitude; thence due west along said parallel of latitude 32 miles more or less to the water's edge on the east shore of the Lake of the Woods; thence continuing along said parallel of latitude 14 miles more or less to where the same is intersected by the international boundary passing through the Lake of the Woods.

It is administered by the Department direct.

Parry Sound

This Mining Division comprises the territorial districts of Parry Sound and Muskoka, but does not include the islands in Georgian bay. Mr. McQuire reports as follows:

"Office opened in the month of October, 1906.

"Number of miners' licenses issued, 26.

"Applications for mining claims received and recorded, 33.

"Fees collected, \$367.

"Fees remitted to Department, \$337.

"Considerable activity in prospecting seemed in evidence both by inquiry and otherwise. The office being created so late in the fall the term was too short for much progress.

"I understand that now there is much inquiry for copper properties. Several of the old registered companies are prepared to resume active development work in the spring.

"The office is filling a long felt want and is appreciated by the public, but until it is supplied with the necessary maps, etc., showing the lots already taken up and those still open, it is handicapped to supply necessary information."

Larder Lake

The Larder Lake Mining Division includes the unsurveyed territory around Larder lake described as follows:

Commencing at the northeast angle of the township of Pense on the Interprovincial Boundary between the Provinces of Ontario and Quebec; thence due north astronomically along said Interprovincial boundary a distance of forty-two miles, thence due west astronomically twenty-three and a half miles more or less to the northeast angle of the township of Barnet, thence due south astronomically along the east boundary of the township of Barnet and along its production due south astronomically to the northeast angle of the township of Otto, twenty-four miles more or less, thence due south astronomically along the east limit of the township of Otto six miles more or less to the northwest angle of the township of Pacaud, thence due east astronomically along the north boundary of the townships of Pacaud and Catharine twelve miles more or less to the northeast angle of the latter, thence due south astronomically along the east limit of the townships of Catherine and Marter twelve miles more or less to the northwest angle of the township of Ingram, thence due east astronomically along the north boundary of the townships of Ingram and Pense eleven and a half miles more or less to the place of beginning, containing by admeasurement eight hundred and fifty square miles, more or less.

This tract was formerly comprised within the limits of the Temiskaming Division, but the discovery of gold on Larder lake in 1906 led to the staking out of several thousand claims in that neighborhood during the summer and fall of that year, and the following winter, and required the opening of an office on the ground for the accommodation of prospectors.

Montreal River

A somewhat similar state of affairs led to the setting apart of a portion of the Temagami Forest Reserve under the name of the Montreal River Mining Division. The finding of silver and cobalt ore in the township of James and at Anvil lake, similar in character to that of the Cobalt district, which was reported in the autumn of 1906, attracted a large number of prospectors who staked out claims freely during the winter months following. Part of the argentiferous region lay east and north of the Montreal river within the boundaries of the Temiskaming Mining Division, but the district situated west and south of that river was constituted a separate Division, with a recording office at Latchford. Its limits are as follows:

Commencing at a point on the west bank of the Montreal river at the mouth of Lady Evelyn river near Mattawapika Falls, thence northwesterly along the west bank of said Montreal river against the stream and along the west shore of the several lake expansions therein to where the same is intersected by the east bank of the east branch of said Montreal river about half a mile south of Sinclair's Exploration line run in 1867, thence southerly along the east bank of said east branch of said Montreal river and along the east shore of Smooth Water lake on said river to the portage at the extreme southerly end thereof leading southerly to Apex lake, thence southerly

across said portage to Apex lake, thence easterly across Apex lake and down the small stream flowing easterly therefrom designated as Lady Evelyn river and easterly along the northerly shore of the numerous small lake expansions on said river to Lady Evelyn lake, thence easterly along the north shore of said Lady Evelyn lake to Mattawapika lake and along the westerly bank of Lady Evelyn river to Mattawapika Falls at its junction with the Montreal river or place of beginning.

The Montreal River Mining Division is a Complete Inspection area under the Mines Act, and all claims are required to be inspected for discovery before a lease can be obtained. It is also subject to the Regulations respecting Forest Reserves, which, among other things, require the permission of the Minister of Lands, Forests and Mines before any mineral deposit can be opened up, thus enabling due protection to be given to the timber.

Temagami Forest Reserve

The Temagami Forest Reserve Mining Division covers for mining purposes the same territory as is included in the Forest Reserve, excepting the territory included in the Montreal River Division, as described above. The following is a description:

Commencing at a point on O.L.S. Alexander Niven's base line run in 1881 in latitude north 46 degrees 49 minutes 27 seconds where the same is intersected by the rear or westerly limit of the timber berths laid out on the west shore of lake Temiskaming, which point is nineteen miles west of the west shore of said lake, thence due west astronomically along said base line, a distance of 42½ miles more or less to the southeast angle of the township of McCarthy, thence due north astronomically along the east limit of said township six miles more or less to the northeast angle thereof, thence due west astronomically along the north limit of the townships of McCarthy, McKelcan, Aylmer and Parkin, a distance of twenty-five miles more or less to the southeast angle of the township of Creelman, thence due north astronomically along the east limit of the township of Creelman six miles more or less to the northeast angle thereof, thence due west astronomically along the north limit of the township of Creelman six miles more or less to the boundary line between the districts of Nipissing and Algoma, thence due west astronomically along O.L.S. Proudfoot's base line run in 1888, forming the north boundary of the township of Roberts, six miles, thence continuing along said base line six miles to the 12th mile post thereon, thence northerly to the foot of Long Lake on the head waters of the Wahnapiatae river, thence northerly along the east shore of said lake and down the Wahnapiatae river to Oshawong lake, thence continuing northerly along the east shore of Oshawong lake and along the several small portages and small lakes on the canoe route to the north end of Meteor lake and across the height of land portage to Opickinimika lake, near the head waters of the Mattagami river, thence northerly along the east shore of said lake and down the Mattagami river and its lake expansions to O.L.S. Niven's base line, run in latitude north 48 degrees 27 minutes and 54 seconds, thence due east astronomically along said base line, ten miles more or less to the southwest angle of the township of Whitney, thence due south astronomically six miles, thence due east astronomically six miles more or less to the northwest angle of the township of Langmuir, thence due south astronomically along the boundary line between the Districts of Algoma and Nipissing, forming the west boundary of said township of Langmuir six miles to the southwest angle thereof, thence due east astronomically along the south boundary of the townships of Langmuir, Blackstock and Timmins, a distance of fifteen miles more or less to a small lake on the canoe route between the Great Northern Bend on the Montreal river and Night Hawk lake, thence southerly along said canoe route passing through Trout lake to the Great Northern Bend on said river, thence southerly along the easterly bank of the Montreal river down stream and along the easterly shore of the lake expansions thereon to where the easterly shore of Bay lake is intersected by the northern limit of the fifty square mile timber berth under license to Gillies Brothers, Limited, thence on a course south fifty-five degrees 35 minutes west astronomically along the north limit of said timber berth

a distance of three miles and five chains to the northwest angle of said timber berth, thence southerly, westerly and southeasterly along the western or rear boundary of the several timber berths laid out on the west shore of lake Temiskaming to the place of beginning.

The Temagami Forest Reserve Mining Division is administered by the Department, because of the special attention required to be given to the valuable pine and other forests which it contains.

Provincial Assay Office

Mr. A. G. Burrows, B.A.Sc., Provincial Assayer, reports as follows on the operations of the office for the year 1906:—

This office was established in 1898, by the Government of Ontario, as an aid to the mineral development of the Province. It affords prospectors and others interested in mining, facilities for having samples from their finds examined reliably, and at a nominal charge. It is especially of value to parties living in the remote and partially settled portions of the Province, where there are no means at hand for having their minerals tested satisfactorily.

The office is located in the City of Belleville, on Victoria Avenue, where a two storey brick building is fitted with the necessary appliances. The lower floor is utilized as an office, store room and grinding room, while the upper floor is devoted to assay and analytical work.

During the year 1906, 1,838 samples were quantitatively tested for one or more constituents; and 191 samples were examined by hand inspection or rough qualitative methods to determine probable commercial value. This was the most successful year in the history of the office, due no doubt to the great impetus given to prospecting by the phenomenal finds in the vicinity of Cobalt. Samples were received from as far north as lake Abitibi. While the bulk of the material was from the region between Sault Ste. Marie and lake Temiskaming, still many samples came from the western portion of the Province (Rainy River and Thunder Bay), and the eastern mining belt of North Hastings, Addington and Frontenac. A very miscellaneous variety of samples was examined, including gold, silver, copper, cobalt, and nickel ores; clays, marls, limestones, peats and other non-metallic substances.

Work for the Bureau of Mines

The following services were rendered the Bureau of Mines:—

1. Issuing reports on samples submitted by the Government geologists, of rocks, peats, clays, etc., collected in their summer field work.
2. Analyses of a number of clays for Mr. M. B. Baker's Report on the Clay Industry of Ontario.
3. Assays of samples, taken by the Inspectors of claims for the Temiskaming Mining Division, to determine the presence of valuable mineral as required for the passing of claims.
4. Special analyses of rocks and rare minerals submitted by Prof. Miller, Provincial Geologist, which are of scientific interest.

Work for the Public

The following services have been performed for private parties:—

1. Issuing reports, consisting of assays, analyses, identifications, etc., of samples submitted for examination. These reports are confidential, and duplicates are issued only on the advice of the parties for whom the examinations are made.
2. Supplying information to parties having economic minerals, etc., who desire to be put in communication with prospective buyers.
3. Making check assays and analyses in cases of dispute as to correct values, and also examining samples in which it was claimed there were certain metals of commercial value. Samples supposed to carry molybdenite were found to be graphite or black mica.

Rusty mica was also mistaken for gold, while platinum was reported in several samples, in which none could be found. In several cases considerable money had been expended on properties supposed to carry certain metals, which could have been saved, had reliable tests been made on surface samples. One party stated that he had laid out a large sum on a property on which had been reported molybdenite, but which proved to be only a pyritous graphite. Another party had mistaken a yellowish iron pyrites for copper pyrites, and another did a good deal of work on a green schist, believed to be a very wide gold lode, the value of which had been obtained by panning, but samples of which showed no gold when subjected to a fire assay at this office.

The following determinations were made during the year, checked by duplicates where possible:—

Assays

	For Bureau.	For Public.	Total.
Gold, amalgamation .....	.....	3	3
Gold, fire assay	737	744	1,481
Silver.....	750	607	1,357
Platinum.....	....	11	11
Copper.....	9	148	157
Nickel.....	11	32	43
Cobalt.....	25	35	60
Arsenic.....	3	22	25
Lead.....	1	47	48
Zinc.....	....	10	10
Tungsten.....	....	1	1
Bismuth.....	....	1	1
Molybdenum.....	....	3	3
Total	1,536	1,664	3,200

Analyses

	For Bureau.	For Public.	Total.
Metallic iron	7	80	87
Silica	32	23	55
Ferrie oxide.....	32	13	45
Ferrous oxide.....	3	2	5
Alumina	18	13	31
Lime	32	25	57
Magnesia.....	32	22	54
Alkalies.....	32	4	36
Phosphorus.....	1	34	35
Sulphur.....	17	46	63
Titanium.....	1	15	16
Carbon.....	....	4	4
Volatile combustible.....	....	3	3
Miscellaneous	31	16	47
Total	238	390	538
Total determinations.....	3,738		

Fees amounting to \$1,584.65 were collected during the year and forwarded to the Bureau of Mines. The value of the work rendered the Bureau of Mines at lowest circular rates was \$1,428.65, making a total value of \$3,013.30 for the work of the office.

All determinations are made by standard analytical methods, and in duplicate to avoid error in issuing certificates. A sample of pulp is retained for further examination on request of the sender.

Samples brought personally to the office are examined free of charge. This does not include any quantitative determination, but is simply an opinion as to probable commercial value.

Sample bags and mailing envelopes are supplied parties desiring to send in samples, and circulars of rates are forwarded on application.

One laboratory assistant was employed during the year, Mr. W. J. Embury, who left in January 1907 to accept a position as assayer with the Eldorado Copper Mine, Hastings County, Ontario.

SUMMER MINING CLASSES

BY W. L. GOODWIN

Itinerary

The first week of May 1906 was taken up with the work of preparing the mineral specimens, printed labels, etc., for the summer work.

I left Kingston on May 9th, and spent a few hours in Toronto conferring with Mr. Gibson, and buying some necessary supplies. It was decided to devote all the available time to the Temiskaming district. North Bay was reached next day, and on the morning of May 11th I took train by the Temiskaming and Northern Ontario railway for Haileybury. The train was crowded with prospectors and mining men. From some of these I obtained information about centres where prospectors were gathering. I learned that a good prospect of iron ore was being developed near Temagami (Mr. A. Scott in charge).

Next day (May 12th) I was joined in Haileybury by Mr. J. Watson Bain, and we made preparations for holding the class there in the Orange hall, which was engaged for us by the Council. The class was opened on Monday, May 14th, and closed on Saturday, May 19th. On that day Mr. Bain went to Toronto to give evidence in court.

I went as far as Cobalt and arranged with Mr. R. Y. Fitzpatrick, who was in charge of the reading camp there, to give some assistance. Monday, May 21st, was spent in moving the outfit down to Cobalt. I was met at the station by Mr. Armand de Bruyne (in charge of Major Morrison's camp) who kindly provided a packer to carry the tent down to the camp, where we slept during the stay at Cobalt. The class was opened that evening and closed the following Saturday. But the attendance had been so large that we decided to continue the work in Cobalt for another week.

This brought us to June 2nd, when we made preparations to move to Giroux lake. We were again indebted to Mr. de Bruyne for assistance in moving our camp outfit. From Cobalt we went on June 4th to Argentite, and thence by way of Cross lake to the University mine, where the class was to be held. After getting our luggage to the mine on one of Reamsbottom and Edwards' carts, we borrowed a canoe and paddled across Giroux lake to Professor Miller's camp on the Gillies limit. Here we found a hearty welcome, and a place already cleared for our tent. The class was begun at the University mine on Tuesday, June 5th, and closed on the 11th.

The 12th was spent in packing and moving to Cobalt, where we spent a day in rearranging the mineral boxes. We were so much interrupted by prospectors asking for specimens and information, that it was decided to give an opportunity for another class at Cobalt later in the season. We left for Gillies' Depot on June 13th, and were met by Messrs. Bromley, Smith, Singleton and Jones, who kindly helped us with our luggage. Mr. Riddell, manager for Gillies Bros. supplied a truck and teamster to take our stuff down to the camping place on the high bank of the Montreal river. The class was opened in the Gillies Bros.' repair shop next day, and was closed on Wednesday, June 20th.

On June 21st, we moved down to Latchford and opened a class in an unfinished store kindly put at our disposal by the owner Mr. Simpson. The class was continued here until Thursday, the 28th, when we proceeded to New Liskeard, where a class was opened in the Orange hall on the 29th.

Monday, July 2nd, being a public holiday, no class was held. We drove five miles to Ritchie's farm on Sutton bay, hired a boat and rowed across to Gray's. Mr. Gray was prospecting a small calcite vein showing on the face of a cliff near the shore. His boys guided us to Tighe's about a mile and a half, where we had dinner. We then followed a trail to Synder's, near which is Bucknall's mine, a fine vein of smaltite and

niceolite with bismuth and small silver values. The rock is conglomerate. The claim (lot 5, Con. I, Casey township) was being worked by Mr. Bucknall and his sons. They had a shaft down 28 feet. On adjoining lots were other veins of smaltite and niceolite. We secured a fine lot of specimens, as many as we could carry over the trail. We were allowed to pick out the best of everything in sight.

The class in New Liskeard was closed on Friday, July 6th. In the meantime we had received a numerously signed petition to spend a third week in Cobalt. We accordingly moved down on Saturday, and opened a class there that evening in the reading camp, then in charge of Mr. E. W. Bradwin, who gave us much assistance while we were there. We again made our camp with Major Morrison, near the 101st mile post. His men carried our luggage from the Empire siding and put up the tent all ready for us when we walked down after the lecture, tired with the long day's work.

The third class in Cobalt was closed on Friday, July 13th, and on Saturday Mr. de Bruyne helped us pack our tent down to Empire siding, where we took train for New Liskeard. We were sorry to leave behind the pleasant associations of Morrison's camp.

An early start in New Liskeard on Monday morning, preceded by a hearty breakfast at the Chinese restaurant, brought us to the Gipsy's landing place at the bridge across the Wabi. We left for Tomstown at 7 a.m., and were received there by the student missionary Mr. Wm. Hay, through whose kindness we were allowed to hold the class in the comfortable log building which is a combined church and manse. There were other familiar faces at the landing place (a steep bank of slippery clay) and our luggage was taken in hand by mining students and graduates and rushed up the bank. It was a case of "many hands make light work." The class was opened that evening and closed on Saturday, July 21st.

The attendance was small at Tomstown, owing to the scattering of prospectors to somewhat distant points. We therefore made a flying visit to the End of Steel on the 20th, taking along a box of minerals and some apparatus. We found a large number of prospectors camped near the railway. Mr. Bain, therefore, stayed to open a class while I returned to Tomstown to wind up the class there.

On the way to End of Steel I met my brother E. P. Goodwin, C.E., returning to District D, Transcontinental railway survey. He reported that wheat had ripened at his camp near north end of lake Abitibi on September 1st. Potatoes, peas, beans, radishes, lettuce, etc., had been raised there.

On Friday, July 27th, the last class of the season was completed at End of Steel, the "farthest north" educational work for Ontario.

Notes

The summer's work was distinguished from that of every preceding summer, except to some extent that of 1905, by the large number of prospectors reached while they were in the field. There must have been several thousand prospectors at work in the district during the summer of 1906. But as they were constantly leaving the district, the number there at any one time was much less than the grand total. The majority prospected at large, searching for extensions of the field. Those who attended the classes were urged to prospect for minerals other than silver and cobalt, and the instructions given and the specimens supplied gave them a better chance to make finds. We tried also to give as clear directions as possible about the geology of the district, and the illustrated lectures given at the close of the lessons on minerals and rocks, constituted a short popular course on the elements of geology, with special reference to the district in which we were working.

The average of intelligence and education of the prospectors was very high, and it was felt that we were touching every part of Ontario with this elementary education in rocks and minerals. The prospecting in the Temiskaming district has certainly been

done in great part by our own people, but there has been a good sprinkling of men from all parts of Canada, and indeed from other countries far and near.

There was constant enquiry for advice as to books to read in order to follow up and extend the information got in the classes. Prof. Miller's "Minerals and How they Occur," published about the time the classes began, was used by a great many.

By means of a very simple portable outfit we showed the classes how to identify bloom, how to distinguish smaltite from mispickel and pale iron pyrites, and how to test for silver. Some of the men made up small sets of apparatus for these tests and took them into the field.

The total number of men who attended the classes during the summer was about 930. This implies a distribution of about 30,000 mineral specimens.

Visitors from other countries remarked upon the rather unusual character of these summer mining classes, and expressed their wish that the same idea might be carried out in their own countries. Ontario was considered to be unusually enterprising in this respect. Now that the high schools have taken up the study of geology and mineralogy, it becomes necessary to consider whether the summer mining classes may not be discontinued in the near future, or their character be changed so as to convert them into summer schools of applied mineralogy and geology, held in some mining centre or centres during the months of July and August, so that they might be attended by teachers. The older prospectors and miners of the Province have been pretty generally reached during the twelve years since the classes were started. It may be urged that very few prospectors and miners ever reach the high schools. For this reason and on account of the great practical importance of the subject, some steps might be taken to put a practical acquaintance with the elements of mineralogy and geology within the reach of every boy in Ontario. There are boys in every county who take to such studies naturally and eagerly. It is not necessary to make such subjects a necessary part of the curriculum required for High School Entrance. An enterprising teacher in a country or village school will find time and energy to lead a willing lad through a simple course of observation and testing, if the specimens and a good book are available.

Haileybury

Councillors Warner, Thompson and Norfolk arranged for the use of the Orange hall for the sessions of the class. An electric wire was put in by Mr. Beach, and we were looking forward to using the electric lantern instead of the less brilliant acetylene apparatus. But unfortunately for our hopes, the sawmill with which the power house was connected burned down next day, and we had to fall back on the acetylene lamp. The town was full of prospectors outfitting, or coming in to buy supplies or have assays made. We found that our old friend David John, formerly of the Mikado mine, had opened an assay office and was doing a rushing business. In spite of the large number of men crowding the little town, there was no disorder.

We visited a small prospect about a mile west of the house of Professor Sharp, who kindly guided us to the spot. A small party of men were at work. A little bloom and smaltite were noticed. A good quantity of diabase (gabbro) was collected at the first rock-cut south of Haileybury, Niagara limestone from the shore near the town, and specimens of granite, etc., from boulders. We were kept very busy examining specimens for prospectors. Several good pieces of copper pyrites were brought in. We laid a good deal of stress on the copper and iron possibilities of the district. Prospectors were anxious to complete their sets of specimens and to get out into the field. We therefore opened a morning class, so that altogether we kept three classes running, one at 9 a.m., a second at 4 p.m., and a third at 7 p.m.

By permission of the manager, Mr. Warner, we collected a fine lot of cobaltite samples from the ore pile at the Benn mine. Mr. E. Wright kindly took us down the lake in his gasoline yacht. While working on the ore pile we noticed a very heavy

explosion towards the east. This was afterwards learned to be the explosion of a dynamite magazine in Cobalt (May 18th) caused by the bush fires, which were burning everywhere in the district. The explosion wrecked the northern part of the town, and broke windows everywhere. There were no fatalities, but some very narrow escapes. The fire was finally got under control by running a long pipe line from Cobalt lake and pumping water with the engine at La Rose mine.

The total attendance at Haileybury was about 95, and the average attendance 53.

Cobalt

The classes were held in the rooms of the Reading Camp Association. In the absence of Mr. Bain, the work would have been more than I could have managed, had I not had the volunteer assistance of Mr. A. Bromley Smith, who managed the lantern and helped hand around specimens. Mr. R. Y. Fitzpatrick proved a very efficient assistant, and his services were continued after Mr. Bain's return from Toronto, as the crowds were too large for us to serve with the mineral specimens. Classes were held at 10 a.m., 3 p.m., and 7 p.m., so as to give a chance to those who were engaged at different times of the day. We were kept busy between classes, examining specimens, testing for silver and cobalt, and showing prospectors how to make tests. It was hard to get time to eat. Fortunately our camp was two miles away, so that we were able to beat a retreat and rest when tired nature rebelled. The work grew in volume and intensity every day. The town was full of intelligent men, eager for information about minerals and rocks.

At the end of a week it was quite evident that another course would have to be given in Cobalt, as there was a constant stream of prospectors arriving. We therefore dismissed the first set on Saturday, May 26th, and began with a new class on Monday. The average attendance during the first week was 158, and the total attendance about 250. The attendance was quite as large the second week, but we were obliged to limit the work by cutting off the morning class. The average attendance for this week was 124, and the total attendance about 200.

In response to a petition signed by a large number of prospectors, we held a third class in Cobalt, beginning on July 7th. The town was not nearly so crowded as in May, but prospectors were numerous enough to give us plenty to do. Average attendance was 46, with a total attendance of about 65.

While at Cobalt we collected smaltite and bloom at Morrison's claim; good specimens of Keewatin greenstone from the east shore of Pickerel lake; and diabase crusted with epidote from the hillside across the railway track from La Rose mine.

The night of May 31st and the morning of June 1st were spent pleasantly at Seymour's camp on the west side of Sasaginaga lake, a short distance west of Cobalt. Mr. Seymour's cottage was a delightful haven of rest. The Trethewey mine was visited on the way back to Cobalt.

On the morning of May 31st, we walked across the Gillies timber limit from Morrison's camp at the 101st mile post to Prof. Miller's camp at Diabase point, Giroux lake. There we found a very pleasant party of Practical Science students and graduates prospecting the Government lands. Arrangements were made for holding a class at the University mine, Giroux lake. On the way back I took the trail past the Savage mine where I met the owners (Messrs. Chapin and Thomson) who kindly ferried me across Cart lake and accompanied me to the McKinley and Darragh mine, another of their properties.

On Sunday, July 8th, we made another visit to Prof. Miller's camp. Going across Giroux lake to attend religious service at the University mine, we found the miners fighting a fire which was threatening the buildings of the Foster mine. We joined in the fray. On the occasion of another visit (July 11th) accompanied by Major Morrison, we met a mining engineer who had come all the way from Erzeroum, Turkey.

Giroux Lake

On invitation of Mr. H. L. Kerr the class was held in the sitting room of the University mine camp, a large frame building, clean, comfortable, and well-appointed and managed. Superintendent D. Cameron, and mine foreman A. McDonald did much to assist us. The attendance included men from the Foster, Drummond, McCormick, Wendigo and other mines. Good specimens of copper pyrites were collected from the open cut west of the camp. Mr. W. G. Blair gave us fine specimens of niccolite from the vein which outcrops close to the camp. Mr. J. G. McMillan, manager of the Foster mine, showed us over this rich property. Mention should be made of the kindness of Mr. A. Bromley Smith, who packed a missing and much needed box of minerals across the timber limit from Gillies Depot.

Average attendance was larger than expected, amounting to 46, with a total attendance of about 60.

Gillies Depot

On the way to this place we spent a day at Cobalt sorting the minerals. It was noticed that a wall-case of fair sized mineral specimens, which I had put up in the reading camp, was being a great deal consulted by prospectors. Prospectors' tents were very numerous along the track in the vicinity of Gillies' Depot. The flies were very bad in the woods, and many prospectors were unable to endure their attacks. A good deal of prospecting was being done around Mud lake and along the Montreal river. Cobalt bloom and smaltite had been found in many places. Our tent was pitched in the midst of a long line of tents along the high bank of the Montreal river, about half a mile south of Gillies' Depot. Our neighbours in "Tentville" were Messrs. Bromley Smith, Singleton, Jones, Leoney, Benson, Goodman and Haskin. These gentlemen were all artistic camp cooks, so that the problems of board and lodging did not arise in this camp. We were all cooks, but the rest of the camp considered Mr. Bain and myself as guests of the camp, so that it was only on sufferance that we were allowed to take a hand in the kitchen.

The class was held outdoors, the men sitting comfortably on a pile of square timber, or standing in the lee of the smudges when the flies were bad, as they generally were. Nearly all the members of the class were practical prospectors, and attended very regularly. We wish to record our appreciation of the kindness and hospitality of the people of "Tentville" and of Gillies' Depot. The average attendance was 34, and the total attendance 55.

Latchford

This place is about ten miles south of Cobalt. Here the Temiskaming and Northern Ontario railway crosses the Montreal river, which expands about this point into Portage bay, a promising region for prospecting. Several small steamers run up the river from Latchford to Pork rapids, and prospecting was active all along their route. Mr. H. M. Wilson, manager of the Edison mine took us up the river in his gasoline yacht on June 25th. We left the Montreal river a little below Pork rapids, and threaded our way up a small stream which drains Trout lake. At the Edison camp we had dinner, examined the mine—veins of smaltite in diabase with much copper pyrite. Close at hand in the same formation are claims held by Darby and others. Heard of much prospecting around Anima-Nipissing lake, where a considerable body of pyrrhotite was located.

Latchford is growing rapidly and should become a place of some importance. Two large sawmills form a nucleus, outside of possible growth of mining enterprises in the neighborhood. Owing to a difficulty and misunderstanding about the place of meeting, many of the prospectors missed us the first evening, but after that the attendance was very steady. The average attendance was 57, and the total attendance about 95.

New Liskeard

The class was held in the Orange hall, which was engaged for our use by Major McKelvie and the Council. The town had grown much since last year. Arrangements were being made to instal an electric light and waterworks system. The water problem is a serious one in the whole district, not because of the lack of water, but on account of the rapid influx of population, which gathers at centres in large numbers before any adequate provision is made for a water supply.

The class in this place was made interesting by an unusual amount of discussion started by members of the class. On July 5th we went with Messrs. Ritchie and Peters to visit some properties of the Blanche River Mining Company, situated in Hudson township about 14 miles west of New Liskeard. The formation is banded slate and diabase. We collected good specimens of malachite for the use of the class.

The average attendance was 37, and the total attendance about 50.

Tomstown

The class here was held too late in the season to catch a large number of prospectors. We put up our tent beside the log building which was church and manse, and boarded at McKay's hotel. Tomstown was named after the first settler, Mr. U. H. Thomas, known everywhere as Uncle Tom. It consists of a long street running back from the Blanche river, which gives it steamboat connection with New Liskeard and Haileybury. Uncle Tom has found the main street too noisy for him, and has moved back into the woods about half a mile, where he has built himself a snug house and made a garden, which attests to the kindliness and fertility of the soil of this region. We had the last of the strawberries from his luxuriant patch on July 22nd.

On account of the small attendance, it was decided to cut the class short and go on farther north. It was intended to hold a class at Charlton, a new settlement about six miles west of Tomstown, but experience at the latter place decided us to go on at once to the End of Steel in Boston township.

Average attendance was 11, and the total attendance about 25.

End of Steel, Boston

This class was opened here in the dining camp of Mr. A. R. Macdonell, contractor. Many prospectors were camped near, and prospecting was going on actively. We visited some of the prospects and noticed iron and copper pyrites, zinc blende, galena and molybdenite. There are a number of large quartz veins to be seen. Some of them may carry gold. Claims had been staked near the railway by Miller W. Young and others. Some specimens of specular iron ore were brought in for identification. There is a large quartz vein in the third rock-cut north of Macdonnell's "Boston Headquarters" as the camp is called. Quite a bunch of light colored zinc blende was seen on the hill on the east side of the railway track. The rock is greenstone and gneiss (apparently) much disturbed. Thanks are due to Mr. J. G. Mulligan for the use of the dining camp and for many kind attentions.

The average attendance was 20, and the total attendance about 35.

MINES OF ONTARIO

BY E T CORKILL

In the description of the working mines of Ontario the same subdivisions will be adhered to as in the Fifteenth Report, namely:

1. Northwestern Ontario, embracing all the region north and west of Port Arthur.
2. Sudbury and the North Shore, which includes the section from Sudbury west along the line of the Sault branch of the Canadian Pacific railway, and the Michipicoten District.
3. Temiskaming, which embraces all that part of the district of Nipissing, through which the Temiskaming and Northern Ontario railway extends, including the Cobalt, Montreal River and Larder Lake regions.
4. Eastern Ontario, comprising that part of the Province which lies south of the Canadian Pacific railway running from the Ottawa river to the vicinity of Sudbury.



Making a mine in the forest.

General Remarks

Very little gold mining was done in Ontario during 1906, with the exception of operations at Sturgeon lake and in the Upper Manitou region. Here considerable development work was done. With the excitement caused by the reported discovery of gold at Larder lake, a great rush was made for that section last winter, and thousands of claims were staked. Practically no development work has as yet been done there, and it is therefore impossible to make any statement regarding the future of the camp.

Gold is also reported to have been discovered in the Abitibi country. The building of the Temiskaming and Northern Ontario and National Transcontinental railways will

furnish easy access into this section. With the usual rush and to satisfy the demands of stockholders or to assist in selling stock, stamp mills are being ordered by some of the companies operating in these new fields. This has been Ontario's great drawback, namely, the installing of expensive machinery before the ore bodies have been tested, and it is to be hoped that the majority of the companies will prove up their ground before going to the expense of erecting costly works on the surface.

A great amount of money has been spent in western Ontario during the last few years in prospecting for iron. The section of country in the vicinity of lake Nipigon is being quite thoroughly explored by diamond drilling as well as by magnetic surveys. In another part of the Report is Dr. Coleman's Report on this region. The branch of the Canadian Northern railway to Moose Mountain being now completed, the Moose Mountain Iron Company, Limited, will be in a position shortly to ship a large tonnage. The Helen mine at Michipicoten still ranks as the largest producer of iron in Ontario. In Eastern Ontario large shipments of magnetite are being made from the Mineral Range iron mines near L'Amable station on the Central Ontario railway.

Great interest has been taken during the last two years in the development of the copper properties, more particularly along the north shore of lake Huron.

The nickel mines in the Sudbury district still hold the lead in the world's production of nickel. This production is being increased from year to year both by the Canadian Copper Company and the Mond Nickel Company; and with the purchase of the big Whistle property we may hope soon to see some of the deposits on the north nickel range put on a shipping basis. The copper in the nickel ore adds materially to the copper output of the Province.

As in 1905, the greatest activity in mining in 1906 was in the Temiskaming silver-cobalt district. Several new properties have been added to the list of shippers, while none of the old producers have slackened in their output. The tonnage produced from the camp in 1906 bids fair to be doubled in 1907. The finding of silver and cobalt in the township of James and near Lady Evelyn lake, has caused a great inrush of prospectors, and the development of the Montreal river section will be watched with great interest. A full report of the working mines in the Cobalt district will be found in the third edition of the Report on The Cobalt Nickel Arsenides and Silver Deposits of Temiskaming by Prof. W. G. Miller.

In regard to the observance of the regulations of the Mines Act concerning the working of mines, it is necessary to call the attention of mine managers to the carelessness or ignorance of a number of their workmen in the handling of dynamite, also to the importance of reporting missed holes and the care necessary in having them reblasted. The attention of the mine managers is again called to that section of the Mines Act which prohibits any building to be erected within 50 feet of the shaft house.

I.—Northwestern Ontario

GOLD MINES

Operations in the gold mines of the northwestern part of Ontario in 1906 may be thus described:

Minto Mine or A L 200

This property, lying about three miles north of the Atikokan iron mine, had very little work done on it during the last year. A stamp mill had been hauled in and some work was done preparing a site for it. The owners are the Reading Mining Company of Buffalo.

White Lily

Mr. Buxton, formerly of the Ideal mine, has purchased this property. It lies about eight miles northeast of Kawene station on the Canadian Northern railway, and near Crooked Pine lake. Considerable work is being done on the property by the present owners.

The Manitou district is reached either by the all land route, 22 miles in length, from Dinorwic, or by steamboat from Wabigoon to Beaudro's landing, thence by land to Manitou lake. Since the rich strike on the Laurentian in 1905, there has been increased activity in the development of the properties in this section.

Laurentian Mine

Since last inspection, work has been carried on continuously. No further sinking has been done, but on the first level north drift at a distance of 35 feet from the shaft a stope has been carried up for a distance of about 25 feet and for a length of 35 feet.



Stamp mill, Laurentian gold mine.

The ore from this stope, part of which was high grade, was milled. On the south drift a raise has been begun about 15 feet from the shaft and has been carried up about 50 feet. On the second level, which is at a depth of 200 feet, drifts run north 100 feet and south 25 feet. At 18 feet north of the shaft, a cross-cut has been driven 300 feet to cut the Trudo vein. About 35 feet of drifting north and south respectively has been done on this vein at the end of the cross-cut. Another cross-cut was run east 300 feet, and 40 feet of drifting done north and south respectively on the vein which the cross-cut taps. About 25 feet north of the shaft a raise is being carried up at an angle of 45 degrees. It has now reached a height of fifty feet above the level. A cross-cut has been driven east 40 feet at a point in the north drift 100 feet from the shaft, and a raise started from the end of this cross-cut.

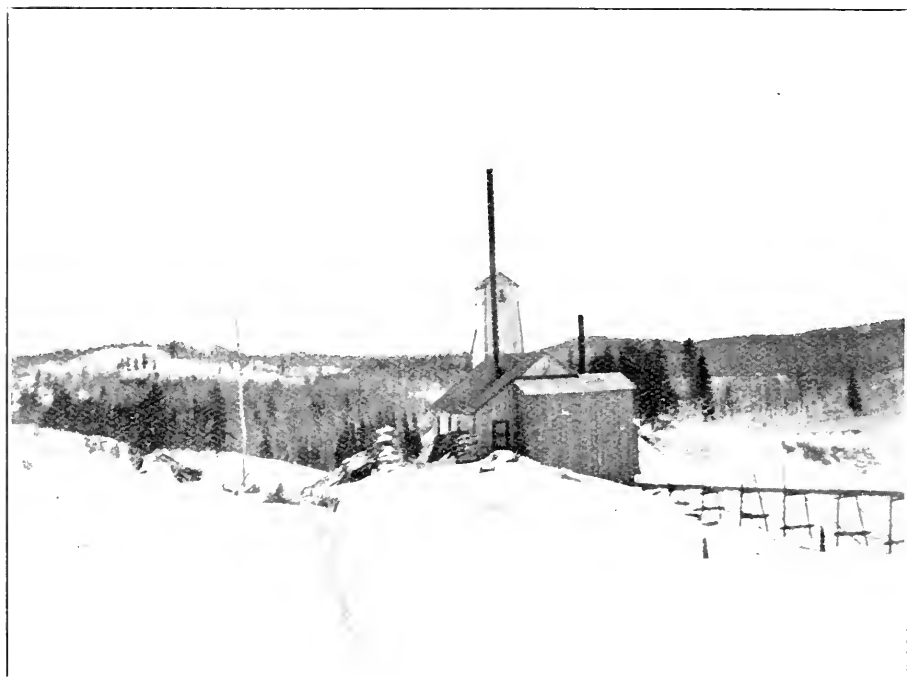
The 20-stamp mill on the property was in operation during part of the year, but was compelled to close down during the winter owing to the lack of water. Since that time a 5-inch pipe line has been laid to the lake one-half mile distant, and a pumping plant installed there.

At the shaft a new changing room for the men and mine office and store room were erected. A new skip road is to be constructed at once. The mine is connected by telephone with the railway at Dinorwic.

The mine is owned by the Anthony Blum Gold Mines, Limited, R. B. Nickerson being superintendent.

Big Master

No work has been done at this mine since last inspection.



Paymaster gold mine ; shaft house.

Little Master

This mine, owned by the Summit Lake Gold Mining Company, resumed work in the spring of 1906 with Dryden Smith as superintendent. Work was confined chiefly to the main shaft. Unfortunately the power house was burned last fall, which necessitated the cessation of work until the same could be replaced. During the winter wood was got out, and preparations made for a resumption of work in the spring.

Paymaster

This mine, owned by the Northern Development Company, has been actively in operation during the year. The first level is at a depth of 200 feet. From here a cross-cut has been driven 20 feet to cut the main vein. The vein has a strike northeast by southwest, and drifts have been run along it 78 feet and 65 feet respectively. Sinking has again been commenced, the shaft at the time of inspection being 241 feet in depth.

The machinery mentioned in the last report has been installed.

The attention of the management was drawn to the danger from fire from having the boiler house connected with the shaft house.

Mr. Manly is superintendent, employing a force of about 15 men.

Gold Rock Mine

The operations of the Gold Rock Mining and Milling Company on mining locations H P 405 and 407, described in the last Report of the Bureau of Mines, were discontinued in the spring of 1906, and no work has been done on the properties since that time.

Detola

The Detola Development Company commenced work on the mining location adjoining the Paymaster on the northeast in the spring of 1906. A shaft 57 feet deep was sunk, when work was abandoned for the winter.

Victory

This mine lies about one-half mile northwest of Gold Rock. Mining work was carried on during 1906, but work had ceased at the time of my inspection.

Eagle Lake District

Very little work was being done in this district at the time of my inspection. During the summer of 1905 the Eldorado and Baden Powell, owned by the Northern Light Mining Company, were in operation, while the Grace mine was engaged putting in machinery during the winter. The Ideal Gold mine, about 6 miles south of Dryden, had also been closed down.

Redeemer Mine

This mine is situated about 10 miles south of Dryden, and is owned by the Redeemer Mining Company, with Mr. Ames as superintendent. On the second level a cross-cut has been driven 400 feet to cut the vein that outcropped west of the vein on which the shaft was sunk. About 50 feet of drifting on the old vein has been done. The shaft has not been timbered from the first to the second level; this will require to be done before work is again resumed. The ore body is quartz interbanded with slate carrying pyrites. The country rock is a fine grained greenstone.

Attention of the management was drawn to the danger from fire of having the boiler house and other buildings connected with the shaft house.

Golden Park

The Golden Park Mining Company, of which Alex. McPhail is superintendent, owns the south 42 acres of lot 5 in the second concession, the southeast 35 acres and the southwest 40 acres of lot 6 in the second concession, Van Horne township. A shaft 37 feet deep has been sunk on the first of the above lots, and one 40 feet deep on the second.

Mining Location E D B 1

As mentioned in last Report, Mr. Holmes is prospecting on the above location for a company from Minnesota. A shaft 50 feet deep has been sunk.

Lake of the Woods District

In the Lake of the Woods district there was very little activity during the last year. The Sultana mine, which is probably one of the best developed mines in the district, closed down early in the summer of 1906, and has not since been reopened. The Bully Boy and Combined mines on Camp Bay stopped development work in 1906, but during the last winter wood was being brought to the mine and preparation being made generally for a resumption of operations this year. These mines were quite fully described in the Fifteenth Report of the Bureau.

On Shoal lake the only mines that showed any signs of activity were the Golden Horn and Olympia. At the Golden Horn work had been carried on intermittently during the last year. At the time of my inspection nothing was being done. The Olympia resumed operations in the spring of 1906, with George H. Vernon of St. Paul, Minn., as manager. A 10-stamp mill has been put in and a mill run was made last fall. A small gang of men are employed at the property.

Sturgeon Lake

The Sturgeon lake section during the last year has received considerable attention. The branch line of the Grand Trunk Pacific railway runs only a few miles to the south of the lake, and will thus afford easy access to the mines, and consequently reduce the cost of handling supplies and machinery. In this area the minerals found are gold, pyrite, chalcopyrite, stibnite, galena and zinc blende in quartz seams, sometimes in quartz and calcite. In nearly all the prospects the values appear to occur at the contact of the Keewatin with an igneous intrusion.

The St. Anthony mine, which has been steadily in operation since 1903, was the largest operator in this district in 1906. Mr. A. L. McEwen was manager, employing a force of 40 men. Two shafts have been sunk each to a depth of 100 feet, and a third shaft has been open cut forty feet in width to the shore of Couture lake. The 10-stamp mill on the property has been operated steadily during the past year with fair results. No attempt has been made as yet to treat the concentrates, which contain good values. The pyrite of the quartz vein is found to be gold bearing, and occurs in the chloritic schists of the Keewatin. These pyritiferous schists near the vein are often found enclosed in the quartz and have been proved to be auriferous.

The Belmore Bay Gold Mining Company have recommenced operations, and the prospects appear so favorable that they are erecting a 3-stamp mill for the treatment of the ore. This company formerly sunk a shaft 250 deep on their location.

A number of other prospects in the vicinity are being worked, one of which, owned by Mr. T. K. Bernard, situated just north of the narrows on a small island, shows some free gold.

Atikokan Iron Mine

Owing to the delay in the completion of the blast furnace at Port Arthur, there was practically no mining work carried on here in 1906. The power plant described in the last report of the Bureau was completed and boarding houses were erected. The tunnel which had been driven through the mill was widened to permit of double-tracking to the ore body. The spur from the main line of the Canadian Northern between Kawene and the Hospital siding to the mine has been completed. Mining operations commenced about the first of May 1907, and shipments will be made regularly to the company's smelter at Port Arthur.

The same company have completed their blast furnace at Port Arthur, and it was blown in about the fifteenth of July, 1907. This marks a new epoch in the mining and smelting industry of western Ontario. The ore body from which the company obtain their ore supply was opened up some years ago, but owing to the difficulty of trans-

portation it has lain idle. The ore is a magnetite containing a small percentage of sulphur. The company have installed at the plant a roasting furnace for roasting off the sulphur contents before charging, using the furnace gases for fuel. The company have also built about 100 coke ovens and will thus be enabled to make their own coke. This was made possible by the Dominion Parliament allowing coal used for coking purposes to enter the country duty free.

Mr. J. C. Hunter is vice-president and general manager of the company, and Mr. R. R. Jones, superintendent of the smelter. The smelter is located on the lake front about half a mile west of the business section of Port Arthur.

Shilton or Northern Ontario Sulphur Mine

As referred to in the last Report of the Bureau and fully described in the report of Mr. E. L. Fraleck, on the Iron Pyrites industry in the present Report, this mine has been opened up for some two or three years. The ore body has been opened up to a depth of 125 feet and a considerable tonnage blocked out. During the winter of 1906 a plant was hauled in over the ice for installation, and shaft house, ore bins, boarding houses, etc., erected. Shipping will be begun as soon as the railway to Fort William is completed.

Tip-Top Copper Mine

Owing to the advanced price of copper, many of the copper properties in the Province, which were either low grade or some distance from the railroad, have been re-opened. The Tip-top mine, seven miles distant from Kasheboiwe on the Canadian Northern railway has been working steadily during the past year. No inspection was made of the mine during 1906, as the main shaft was not unwatered and most of the work was done in stripping and opening up the vein on the surface. Col. Ray of Port Arthur is the owner, and work was carried on under the direction of Capt. Sandow.

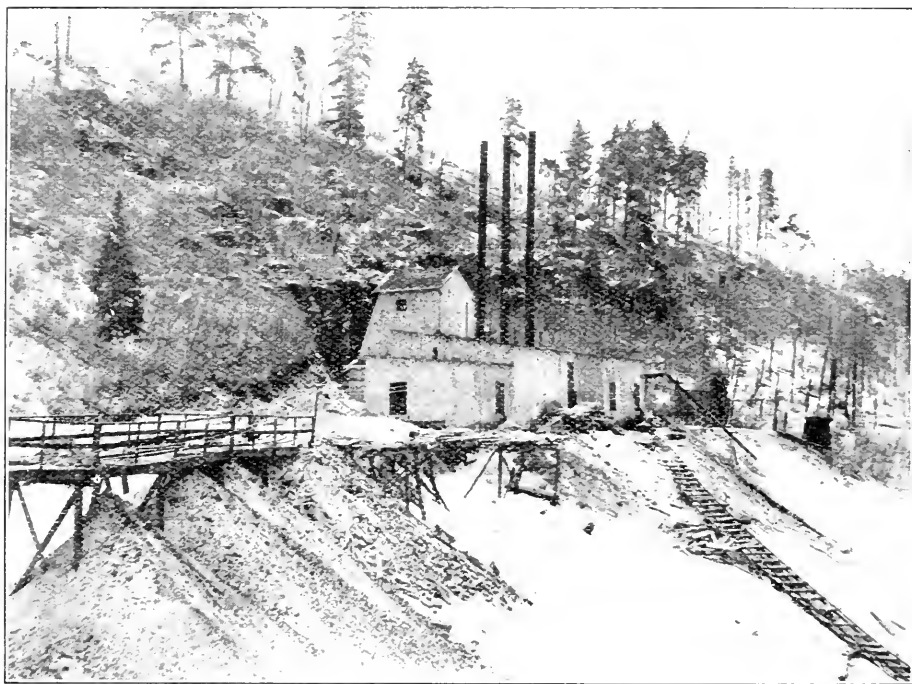
West End Silver Mine

The former owners of this mine, the Consolidated Mines Company of Lake Superior, Limited, have sold out their holding to the Hanson Consolidated Silver Mining and Milling Company, Limited, with Mr. C. L. Hanson, manager. No work had been done on this property since the first of 1904 until the present owners began work in the fall of 1906. Since that time work has progressed steadily, operations being carried on chiefly on the third and fourth levels, the levels being approximately 35 feet apart. On the fourth level a drift has been driven east 850 feet. From this drift cross-cuts 30 feet in length have been run south, cutting a vein of calcite. About 500 feet east of the shaft stoping is being carried on at several places on the vein. No work is being done on the west side of the shaft. The vein varies in width from nothing to 12 or 15 feet, and is composed of white calcspar, amethystine quartz, zinc blende and pyrite, with argentite and native silver. The veins cut through the Huronian slates which are lying very flat. The shaft at this mine dips at 75° to the horizontal, following the pitch of the vein. The vein, although containing two of the principal silver-bearing minerals which form the chief values in the veins at Cobalt, differs from the latter in many respects. The silver values here are disseminated more throughout the vein and although very rich shipments have been made, there is much more low grade mineral than at Cobalt. The veins differ also in width and in their associated minerals. No cobalt or nickel minerals have been found here; while at Cobalt, the zinc blende found here abundantly, is in most cases absent.

The ore from the mine is concentrated in a 10-stamp mill by means of four corrugated rubber Frue vanners and five smooth rubber Frue vanners. The ore is first

crushed to inch or inch-and-a-half size in a Blake crusher. From this it is fed to the stamp mill, where it is crushed to 30 or 40-mesh. The crushed product first passes over the corrugated rubber vanners and the coarser products are separated. The tailings from these are passed into hydraulic classifiers, making three products. These are fed to the smooth belt vanners and the slimes led to settling tanks from the classifier. The mill was not in operation at the time of inspection, but it was intended to start it as soon as the spring opened. The work at the mine was under the direction of Mr. Pritchard.

At the time of my inspection none of the other silver mines in this district were working, but it was reported that two or three were to be re-opened during the present year.



West End Silver Mountain Mine.

II. Sudbury and the North Shore

Canadian Copper Company

With the completion of the company's smelters at Copper Cliff, the attention of the management was turned to the equipment of the mines with the most modern machinery. This was necessitated by the decision of the company to instal electrical machinery at all their mines and works. The development work at the mines, principally the Creighton and Crean Hill, has been pushed ahead, and large bodies of ore proved up, chiefly by means of the diamond drill. At the smelters about 800 to 1,000 tons of ore per day are being put through, and provision is being made to increase their capacity.

All the ore is at present being brought to Copper Cliff and roasted by means of open heap roasting at No. 3 roast yard, which is north of the town. The size of the roast heaps has been constantly varied for the purpose of ascertaining the most suitable

size, and it has been found that the roast heap most advantageous is that which requires a three months' roast.

The ore is loaded from the roast heaps to the cars by means of a steam shovel. The old system of building the roast heaps, namely, unloading the cars by wheel barrows, has proved most satisfactory as yet, the superintendent claiming that a much better roast is obtainable from roast heaps built by this means than by any other method yet devised. The management of the different departments remains practically the same, Mr. A. P. Turner being president and general manager, Capt. John Lawson, general superintendent and mine captain, and Mr. D. H. Brown, superintendent of the smelter.

Creighton Mine

Since last inspection the work carried on at the Creighton mine has been continued on the same method. The open pit 140 feet deep has been extended west and north-west, following the continuation of the ore body. The west and northwesterly face of the open pit is all ore, and is being mined as a large over hand stope. The ore is all handled, after being blasted down, by shovelling into cars and tramping to the shaft. About 1,200 to 1,500 tons of ore is hoisted every 24 hours. No. 2 shaft has been sunk 180 feet deep, about 330 feet west of No. 1 shaft. This is a three-compartment hoisting shaft, the walls being concreted for a depth of 40 feet. A cross-cut has been put through to the ore body on the 160-foot level, and a raise put through to the surface. From the cross-cut a drift has been put through to the open cut. The mine water is handled by a 100-gallon pump geared to a 15-h.p. 550-volt motor, which operates at 750 revolutions per minute. A new rock house has been erected at No. 2 shaft. This is 72 feet high and 42 feet by 46 feet in plan. The ore is fed direct over grizzlies to two 18 by 30-inch Blake crushers. The product from the crushers passes through revolving screens to rubber belts 3 feet wide and 50 feet long. Here the rock is picked out and thrown into a rock pocket, while the ore passes over the belts into the ore bins. The two railway tracks beneath the rock houses admit the trains on which the ore is taken to the roast yards at Copper Cliff. The crushers and belts, which are in two sets, are each operated by a 50-h.p. 3-phase 550-volt induction motor. The bottom arches of the rock house are built of reinforced concrete.

During the last year the entire surface equipment of steam-driven machinery has been removed and replaced by electrical machinery. The sub-station at the Creighton mine contains three transformers of 275 kw. capacity each. These bring the voltage down from 35,000 to 550 volts. There are two hoisting engines each carrying three drums, which are so arranged that any two can be run in counterbalance, or all three run independently. These hoisting engines are operated by 150-h.p. 3-phase variable speed induction motors. The rope speed is 500 feet per minute, and a capacity is three tons to each skip. The two hoisting engines are set at right angles to each other, the new shaft being operated by a hoist which is parallel with the new rock house. The old rock house and shaft, 500 feet to the east, is operated by the second hoisting engine, the ropes making a turn through sheaves behind the old rock house.

The mine drills are supplied with air from a compound, direct driven compressor, running at 120 revolutions per minute, and giving 1,635 cubic feet of free air per minute. This is driven by a constant speed 550-volt induction motor of 300 horse power. The air regulation is obtained by automatic Corliss step valves.

The fire protection equipment consists of a 1,000 gallon 6-inch 4-stage pump, direct connected with a 150-h.p. 3-phase 550-volt induction motor. To supply this a steel tank holding 60,000 gallons is erected just outside the power plant.

A new fire proof "dry" and store house has been built. The "dry" has been constructed on the most modern plan with concrete floor, brick walls and tile roof; it is 36 feet by 80 feet in plan, and well lighted and heated. Two hundred and five lockers

are provided, each separate. Between the rows of lockers are long enamelled iron basins for the use of the men. In one corner of the building are lavatories and shower baths. Mr. William Hambly is mine superintendent, employing a force of 200 men.

Crean Hill

This property, located on the south half of lot 5 in the fifth concession of the township of Denison, and about a mile and a half northeast of the Vermilion mine, was opened first in 1905. Since that time the property has been diamond-drilled very extensively, and the shaft sunk to a depth of about 300 feet. The latter is on an incline of 57 degrees to the horizontal, having four compartments with three hoistways and a ladder way, and is concreted to a depth of 40 feet. The first level has been sunk to a depth of 80 feet, and a cross-cut 40 feet in length driven to the ore body. The ore body on this level has been opened out to a width of 50 feet and 70 feet in length. The old prospect shaft was sunk about 100 feet from the new shaft, and they are connected underground. The second level at a depth of 140 feet has a cross-cut driven to the ore body, and the latter has been opened up the same as on the level above. Raises have been put through from the second to the first level, and from the third to the second. The third level is at a depth of 200 feet, and has been opened up to the same extent as the other levels.

The shaft has been sunk about 60 feet below the third level. The ore body is found to be dipping at about the same angle as the shaft. The ore contains a larger proportion of visible or massive pentlandite than the normal nickel-copper ores, and as the rock involved is a mixture of soapstone and greenstone, it requires entirely different treatment from the ores found at Stobie and Creighton.

A new rock house has been constructed on the same plan as the one at the Creighton mine and described under that head. The power house is also built on the same plan as the Creighton, except that it is only equipped with one electrically driven hoisting engine with 3 four and-a-half-foot drums. A new "dry" and store house has been built, similar to those at the Creighton mine.

A spur from the mine to the Sault branch of the Canadian Pacific railway at Victoria mines has been built, and ore is hauled thence by rail to Copper Cliff.

Mr. C. T. Griswold is superintendent, employing a force of about 100 men.

No. 2 Mine

This mine was in operation until the first of 1907, when work was temporarily stopped. The ore on the fifth level has been stoped out, and the shaft sunk another hundred feet to the sixth level. The old machinery at the mine has been replaced by an electrically driven compressor and hoist. The mine is being kept free of water.

Quartz Mine

The quartz mine opened up by the Company on lot 8 in the fourth concession of the township of Waters, about one and-a-half miles northeast of Naughton, has been in operation continuously. The new rock house has been completed, and the ore is crushed and screened before shipment to Copper Cliff. A shaft has been sunk on the vein and a quantity of quartz blocked out. About 150 tons of quartz is shipped per day to the smelters at Copper Cliff, where it is used as flux and for lining the converters.

Cobalt Refining Plant

The cobalt refining plant described in the last Report of the Bureau of Mines has been in operation since its completion in 1905. A considerable proportion of the high grade ores shipped from the Cobalt mines has been treated here. The company make no effort to separate the cobalt and nickel at this plant, the rich speiss, which is obtained

after the rock matter has been slagged off in the cupola furnace, being shipped to New Jersey for final treatment. Very few changes have been made in the plant since its installation. The company are however, contemplating doubling its capacity.

The former superintendent, Mr. S. B. Wright, has resigned, and has been succeeded by Mr. McKenzie.

Smelting the Nickel Ores

From the published notes of Mr. David H. Brown on "The Mining and Smelting Equipment of the Canadian Copper Company" I have taken the following description of the new smelter and transformer building at Copper Cliff.

"At Copper Cliff the transmission line enters the sub-station, a concrete building 203 feet by 100 feet, and is there stepped down to a proper voltage for the various electric motors. In this sub-station are installed three Nordberg radial valve blowing engines, while a fourth similar engine is being constructed at present. These engines are rope driven by Allis-Chalmers-Bullock induction motors of 600 horse-power working at 2,200 volts. These motors are arranged to work at three speeds, so that the volume of air delivered to the furnace is under control. The engines are duplex, 42-inch stroke, 70-inch piston diameter, and deliver 320 cubic feet of free air per revolution. The blast for the Bessemer converters is furnished by a Nordberg blowing engine, rope driven by an Allis-Chalmers-Bullock 500-h.p. induction motor running at a constant speed of 375 revolutions per minute. This blower is 36-inch stroke, 40-inch diameter duplex, and runs at 100 revolutions per minute, delivering 12,600 cubic feet of free air per minute at a pressure of 12 pounds.

"For air hoists on furnace doors, for running drills, and for similar mechanical work, a 100-lb. air compressor, made by the Laidlaw-Dunn-Gordon Company, is provided. This is 25-inch stroke, 15-inch diameter on the high pressure cylinder, and 24-inch diameter on the low pressure side, and is direct connected to an Allis-Chalmers-Bullock induction motor of 300 horse-power, running 125 revolutions per minute at 2,200 volts. The motive power for the electric locomotives which take the trains of ore from the ore bins to the furnaces is furnished by one 40 kw. motor generator set, which takes 550 volts, 40 amperes, alternating current, and delivers 250 volts, 100 amperes, direct current.

"The alternating current arc lighting system used for street lamps is supplied by a 75 kw. frequency changer set, in which the 25-cycle current from the transformers is changed to 60 cycles, as required by the arc lamps.

"The blast from the three Nordberg air compressors is carried through 36-inch pipes on an overhead system of supports to the furnace building, which adjoins the sub-station. The furnace building is 357 feet long and 85 feet wide. It covers at present three cupola furnaces, four converter stands, and the relining platform, but these converter stands and their lining machinery are in this building merely as a temporary expedient during the erection of the main converter building. The furnace building is designed to cover five cupolas, of which two have been in operation since July 1904, and the third has been in blast since April 1906, and two more are under construction. These cupolas stand in row down the centre of the building, having on one side two standard gauge tracks for the disposal of furnace slag, and on the other side a 32-foot crane span, on which two 50-ton cranes attend to the handling of furnace matte to the converters, and of Bessemer matte from the converters to the casting moulds.

"The platform on which stands the settlers is 10 feet above the floor of the smelter building. On this rise the concrete bases of the furnaces, so that the hearth plates of the furnaces are 6 feet 6 inches above the tapping platform. The furnaces are 50 inches by 204 inches at the tuyeres, and consist of two tiers of water jackets, the lower or tuyere jackets being 8 feet 6 inches and the upper or top jackets being 6 feet in height. The total height from the lower floor of the furnace building to the charging floor is 35 feet, and the total jacket height of the furnaces is 14 feet 6 inches.

"Each of the tuyere jackets contains four six inch tuyeres, which are bushed down to four inches. The side tap is notched out of one of the middle tuyere jackets on the crane side, and is filled with a water cooled cast-iron side tap jacket 10 inches by 24 inches.

"The furnace slag flows off at the back of the settler into cast iron slag pots, each holding 22 tons. These slag pots are made in sections, with four side pieces and a separate bottom piece. The train of three slag pots is handled by a yard locomotive and poured over the slag dump.

"Matte from the settlers is tapped as required into cast steel ladles 5 feet high and 5 feet in diameter. This is picked up by the electric crane and poured into the converters.

"Four converter stands are provided, and three are in use all the time. The shells are 7 feet by 10 feet 6 inches inside, and revolve in tread rings, 7 feet 8 inches in diameter. The lining is the ordinary mixture of white quartz and local clay, as there is no quartz in the neighborhood containing copper or precious metals. The blow in the Bessemer converter is carried on in exactly the same manner as in blowing for blister copper, except that the operation is stopped as soon as the iron is eliminated. It is a curious point that copper-nickel behaves as one metal in the converter, and that the ratio of elimination of sulphur and iron in these mattes has exactly the same relation to the amount of copper-nickel present as the elimination of these elements in ordinary copper work has to the amount of copper present. The point of elimination of iron is readily known by the color of the flame, and when this shows that nickel has begun to slag, the converter is turned down and the matte cast into a ladle which is poured by the crane into iron moulds. This matte contains about 80 per cent copper-nickel.

"The charges are brought to the furnaces by three trains of seven or eight cars each. These are accurately weighed before leaving the ore bins, and the amount of flux adjusted to the ore under treatment. Some ores, such as Creighton, require silica; others, as Crean Hill, sometimes require lime; in each case the endeavor is to produce a fluid slag which shall carry as little copper-nickel as possible. Slag from the converters, as well as all scrap and cleanings from the cupolas are returned to the ore bins. These ore bins are parallel with the furnace building, and 200 feet behind it. The roast ore from the roast yard, green ore from the mines, slag and scrap from the furnaces, coal and coke, quartz, clay and limestone are all delivered on the upper tracks of the ore bins, 35 feet above the charging floor. The ore bins are 700 feet long and 35 feet wide. This makes a row of bins about 30 feet wide inside, and subdivided into pockets, the length of which differ according to the contents and amount of each substance handled. Ore from the roast yard is handled from the roast beds by a steam shovel into Ingoldsby drop-bottom cars, which can be dumped readily into the bins.

"The ore and other furnace supplies are drawn from the bottom of these bins by means of curved bin gates actuated by a sectional gear wheel and crank. These are spaced at intervals of six feet above two tracks, on which run the charging trains. These tracks form an oval one-third of a mile in circumference, and pass on each side of the furnaces, allowing the cars to be dumped directly into the cupolas. At a tangent from the curve at one end of the charge track, a line branches off to the sample house. The same cars used in charging the furnaces are used to carry the samples of ores, slags, etc., to the sample house bins, twenty-four in number. On the floor below these sample bins, small end dump cars are used to bring samples to two crushers from which the ore is automatically sampled and passed through the various fine-grinding machines. The revert or discard from the samplers is collected in a bin, from which it is dumped into charge cars and taken back to the furnaces."

Mond Nickel Company

The Mond Nickel Company have enlarged their operations during the last year and are now operating in addition to the Victoria mines, the Garson mine on lot 5 in the third concession of the township of Garson. A spur from the Canadian Northern railway running to Moose Mountain is to be built to the mine for shipping the Garson ore to the smelters at Victoria Mines.

Work has been carried on at the Victoria mine on the same system as that described in the last Report. During the summer months the upper levels which have not been completely worked out are worked when the cold weather will not interfere with them. During the winter months all work is confined to the lower levels. The shaft has been sunk to the ninth level. On the ninth level a cross-cut has been run to the ore body, a distance of about 200 feet. The ore body has been cut out the full size, and a drift run on 100 feet further towards the east ore body, where a diamond drill station has been cut and drilling commenced to cut the latter. A raise has been put through from the ninth to the eighth level. On the two ore bodies at the seventh and eighth levels raises have been put through to the levels above and stoping begun. The system

adopted to stope out the ore between the levels is to cut out the ore body the full size on the level. A raise is then put through to the level above. This raise is carried up on a sufficient incline to allow men to walk up without the aid of ladders and yet sufficiently steep to permit the ore from the raise to run to the level below. After the raise has been put through, a floor of twenty feet or more is left and the ore is cut out from under this, all the ore being cut out from one section before going down on the section below. In this manner the roof is kept well scaled as well as the wall of the stope above the men. The ore is taken to the roast yards and smelters by the aerial tram as formerly. About 200 tons of ore per day are hoisted. Mr. C. V. Corliss is superintendent, employing at the mine an average of 50 men

Garson Mine

Considerable diamond drilling was done at this property to locate the ore bodies underground accurately before development work was begun. The shaft was consequently located to the east of and midway between the ore bodies. The shaft which has two hoist ways and ladder way has been sunk to a depth of 225 feet. The first level at a depth of 100 feet has a cross-cut driven west 130 feet. At 75 feet from the shaft drifts have been run 50 feet north and south respectively on the extension of the south ore body. The two ore bodies are about 80 feet apart, and are designated respectively as the north and south ore bodies. The second level is at a depth of 200 feet. The station was cut on this level at the time of my inspection, and a diamond drill hole was being put in to locate the ore body. A new rock and shaft house are in course of erection as well as a new power house. The Wahnapiatae Power Company have built a transmission line from their power plant on the Wahnapiatae river two and a half miles south of Wahnapiatae to the mine, a distance of about ten miles. The company are putting in an electric hoist and an electric belt-driven compressor. Camp buildings have been put up suitable for accommodating about 150 men. Mr. Hall is superintendent in charge, employing about 100 men.

Ontario Nickel Company

This company commenced work during the first part of the present year, having taken over the holdings of the Canada Nickel Company. The mine known as the Totten mine, about half a mile west of Worthington station, has been pumped out, and a 3-drill compressor, boiler and hoist installed. The shaft is 90 feet deep, with little drifting done. North of the Canadian Pacific railway track the company have begun the construction of a refining plant. It is the intention of the management to treat the ore from the mine by a new process, worked out by the manager, for the recovery of nickel. Mr. G. E. McGinley is president, and Mr. W. S. Gates manager of the company.

Shakespeare Gold Mine

The control of the Shakespeare Gold Mining Company has since last inspection been brought up by other interests represented by Mr. B. W. Dunn, who was elected president and general manager. As soon as the new owners assumed control a plan of active development of the mine was adopted, the stamp mill closed down, and all energy devoted to underground work.

The shaft has been sunk to a depth of 300 feet. The first level at a depth of 50 feet is the same as at last inspection. The second level, at a depth of 88 feet, has a drift running east on what was styled No. 1 vein, or rather No. 1 pay streak, for a distance of 270 feet and west 200 feet. A cross-cut has been driven south 30 feet through the quartz and chlorite schists to No. 2 pay streak. The management claim that all the rock between No. 1 and No. 2 pay streaks, is milling ore. Drifts have been run east 170 feet and west 120 feet along No. 2 vein. These veins have been connected by cross-cuts at the easterly and westerly ends of the drifts. A cross-cut has

been run north 30 feet at the westerly end of No. 1 vein. The third level at a depth of 128 feet has a drift running east along the vein 312 feet and at the easterly end of the drift a cross-cut running south 45 feet and north 20 feet. A drift has also been run west 70 feet. From the shaft a cross-cut has been run south 30 feet, and on No. 2 vein a drift has been run east 60 feet. The fourth level at a depth of 175 feet has a cross-cut from the shaft south 60 feet and north 20 feet. Drifts have been run east 100 feet and west 60 feet. On the fifth level at a depth of 227 feet the vein formation has been cross-cut for a distance of 70 feet. The management now claim to have sufficient ore blocked out to warrant them in putting in a 50-stamp mill, which they purpose doing during the next year. A new shaft is to be sunk about 400 feet west of the present shaft.

In the Michipicoten district no work was done on the old gold properties during 1906. Some assessment work was done on claims staked.

The Algoma Power Company are still at work on their power plant at High falls on the Michipicoten river. It is stated by some of the mining companies that as soon as power is obtained from this they will begin operations.

Copper Mines

With the re-opening of the old Bruce Mines and the discovery of some very fair copper prospects, the outlook for the copper industry along the north shore of lake Huron, seems brighter than for some years. The wide area over which copper has been found along the north shore furnishes an inviting field for the prospector. The very siliceous nature of the vein material in which the chalcopyrite is generally found, makes the smelting of the ore a more costly undertaking. The ore also, after a depth of two or three hundred feet has been obtained, is as a rule a concentrating proposition. This of course does not present any insurmountable features, and if ability and common sense are shown in the handling of a number of the properties in this district, a good industry should be the result. In the section of country north of Webbwood a number of copper prospects are being exploited, while the copper deposits on Whiskey lake are attracting considerable attention.

Massey Station

This mine has been developed to a greater depth than any other of the properties on the North Shore. The development work has been fully described in former Reports of the Bureau of Mines, as well as the Elmore oil concentrating plant experimented with there. Some very rich surface showings were opened up in 1906, but very little development work was done. Work was suspended at the mine in the latter part of 1906. The mine was pumped out again this year for the purpose of examination, but work has not as yet begun.

Hermina

Mining work was carried on continuously at No. 3 shaft during the year. It has now been sunk to a depth of 421 feet. The first level is at a depth of 118 feet where a station has been cut. The second level at a depth of 220 feet has 147 feet of drifting east and 75 feet west. The third level at a depth of 320 feet has a cross-cut of 110 feet to cut the vein, and 33 feet of drifting on the vein. The fourth level at a depth of 420 feet has a station cut. A pump station has been placed in a drift 33 feet long, 22 feet below the second level. A sump has been cut here and water syphoned from the level above. One Dubois and two No. 5 Cameron pumps keep the mine free of water. A shaft house 50 feet high has been erected since last inspection.

Mr. S. H. Bryant is superintendent, employing a force of 46 men.



Hermina copper mine.



Shaft house at Hermina copper mine.

Northern Ontario Copper Company

Work was started on this property during the winter of 1905 by the Northern Ontario Copper Company. This company have their head office in Sault Ste. Marie. The property is situated on the north half of section 13 in the township of Thompson, near Dean lake. Access is attained either from Dean lake on the Sault branch or by a nine-mile drive from Blind river. A shaft has been sunk to a depth of 117 feet, and 200 feet of drifting done on this level.

Mr. J. A. Montague is superintendent in charge.

In the vicinity of the Northern Ontario Copper Company's mine, are two properties which have been doing considerable development work during the past year. These are the Jury and the Cobden, and are controlled chiefly by local interests.



No. 2 shaft, and old caved-in stope, Bruce Mines.

Bruce Mines

These mines, which are the oldest in Ontario, have been acquired by the Copper Mining and Smelting Company of Ontario, Limited, and active development work has been begun. Most of the mining work is at present being done at No. 4 shaft. This shaft has a depth of 319 feet, and work is being confined chiefly to the three lower levels, the upper levels having been pretty well worked out by the old operators. At

the 183-foot level stoping is being carried on to the southeast between No. 4 shaft and Craize's shaft, a distance of 145 feet. On the 274-foot level a drift has been driven southeast along the vein to a distance of 375 feet from the shaft. To the northwest of the shaft stoping is being done on the stope between the shaft and No. 3 dike. Northwest of the dike on the continuation of the vein some stoping has been done from the old stope between No. 2 and No. 3 dikes. On the 340-foot level, drifts are being carried southeast and northwest from the shaft on the vein. The drift to the northwest has been carried through to No. 3 dike, a distance of 200 feet.

No. 2 shaft, which is 1,000 feet northwest of No. 4 shaft, is sunk to a depth of 450 feet. All the work in this shaft is being done from the 355-foot level, where a drift is being driven southeast to connect with the drift from the 340-foot level at No. 4 shaft. This drift has been driven southeast 600 feet.



Concentrating mill, Bruce Mines.

The plant at No. 4 shaft consists of two boilers having a combined capacity of about 300-h.p., a 14-drill Rand air compressor, compound air and steam, a 30 kilowatt dynamo operated by a 50-h.p. high speed engine, and a duplex cylinder 12 by 18 inches double-drum hoisting engine, with drums 60 inches in diameter by 36 inches face.

The concentrating mill erected by the old company, situated about 1½ miles east on the lake shore, has been overhauled, and a new 300-h.p. engine for driving the mill machinery, and a 75-h.p. engine driving a Gates rotary crusher, have been installed. The ore is dumped direct from the cars to bins, which feed direct to the crusher. A new bucket elevator raises the crushed product to a travelling belt which delivers it to the storage bins, from which it is fed to the rolls by automatic feeders.

The tracks of the Bruce Mines and Algoma railway lead from the mine to the concentrator. The old system was to have the locomotive haul the cars directly to the bins at the top of the mill. This method has been done away with and a hoist has been put in at the top of the mill and the cars are hauled to the bins by this means. The

main structure covers a ground area of 176 feet in length by 66 feet in width, with a height of 90 feet from the roof to the lowest floor. To the east stand the engine house, 30 by 32 feet in plan; the boiler house 48 by 48 feet, and the concentrate storage bins, 40 by 77 feet. The plan of concentration consists essentially of having the ore crushed by a gyratory crusher to an inch-and-a-half or two-inch product, from which it is fed to rolls. The product from the rolls passes over trommels, and the oversize passes back to the rolls to be re-crushed. The rest of the product is fed to 24 3-compartment Hartz jigs, and the tailings from these, after re-crushing and classifying, are passed over Frue vanners, of which there are 18 installed. It is the intention of the management to instal one unit of the new vacuum process for the treatment of the tailings.

Mr. T. Hayes Sheen is president and general manager, with Mr. H. J. Carnegie Williams, superintendent.

Superior Mine

The Superior copper mine comprises mining locations W D 220, 221, 222, 223 to 227, in all 680 acres in area, lying $4\frac{1}{2}$ miles east by road from Superior mine on the Algoma Central railway. The property is owned by the Superior Copper Company, with head office in Sault Ste. Marie. Mr. F. M. Perry of Sault Ste. Marie, Mich., is president of the Company.

A great deal of development work has been done on the property, chiefly in stripping the ore and sinking shafts on it. No. 6 shaft, on which the work has been largely concentrated, has been sunk to a depth of 300 feet, with considerable drifting and cross-cutting at the different levels. The development work has shown up the property so favorably that the management have decided to build a concentrating plant of 400 tons capacity, and also to build a spur from the railway to the mine. The mill erected at the mine in 1905 has been run at intervals since completion.

Another copper deposit is being opened up at Root River on the Algoma Central railway about eight miles north of Sault Ste. Marie. A shaft has been sunk to a depth of 40 feet with a very fair showing of copper.

But very little work has been done on the Whiskey lake copper deposits since last report. Most of the work done consisted in prospecting the location for other showings of ore. The locations are in places very heavily drift covered, rendering thorough investigation difficult.

Iron Mines

Helen Mine

This mine continues to hold the premier position in the production of iron ore in Ontario. The former superintendent, Mr. R. W. Seelye, has been promoted to the position of superintendent of mines for the Lake Superior Power Company, and Capt. Keenan has been made resident superintendent. During the summer of 1906 the mine was closed down for some time owing to the destruction by fire of the shaft house, crushing plant, machine shop, blacksmith shop, etc. Through the strenuous efforts of the management, new buildings were constructed, and the mine again began shipping within two months of the time it was shut down. The mine has since that time been producing on an average about 800 tons a day.

Since last inspection the work has been chiefly carried on on the third level, which is at a depth of 286 feet. No. 2 shaft has a double compartment hoistway and is used altogether for hoisting ore. All timber and supplies are taken down through No. 1 shaft, which is a double compartment shaft consisting of a cage-way and ladder-way. Both shafts are sunk in the greenstone, and from No. 2 shaft a drift 11 feet in width has been driven 150 feet to the ore body. No. 1 shaft is connected with No. 2 drift by a drift 100 feet in length. This main drift from No. 2 shaft has been driven approximately north 250 feet to the northern boundary of the merchantable ore. From the point where this drift cuts the ore body the main drift has been run east through

the length of the ore body to the eastern boundary of the merchantable ore, a distance of 450 feet. From this main drift auxiliary drifts have been run northeast and southeast at intervals of 50 feet. These auxiliary drifts are driven to the boundary of the merchantable ore. In these auxiliary drifts raises are put up every 40 feet to within about 20 feet of the level above. These raises are then connected and shoots put in, from which the ore is trammed after being blasted into the raise. All the ore is blasted from the stopes into the raises as long as it will run, when the shoots at the extreme end of the drifts are taken out and the whole ore body removed, gradually working back to the main tramway. The stopes are never more than 60 feet in height.

Several shipments of iron pyrites were made in 1906 from the pockets of iron pyrites, which occur in the northwesterly section of the deposit. It was the intention of the management to store the ore in the stopes during the winter in place of stock piling it as formerly. This method was adopted on account of the ore being so solidly frozen in the winter time while stock piling, that operations were much delayed in the summer months in getting it to the boats. The ore from the mine is all shipped by boat during the summer, part to the company's smelters at the Sault, and part to smelters in the United States.

Moose Mountain

The following has been taken from Professor Miller's notes:

"A branch of the Canadian Northern has recently been completed from the main line of the Canadian Pacific a few miles east of Sudbury to the township of Hutton, in which the Moose Mountain iron mine is situated. Moose Mountain is about twenty-five miles north of Sudbury. Ore can now be shipped by rail from the mine. The Canadian Northern, a part of the Sudbury-to-Toronto branch, is in course of construction to the shore of Georgian bay, which will give direct connection between the mine and lake Huron. The Moose Mountain ore, when the railway is completed, can be laid down on lake Huron by a shorter rail haul than the Minnesota mines have to lake Superior. The water route to lower lake ports will be considerably shorter than that from lake Superior ports, and the navigation of the Sault Ste. Marie locks will be avoided.

"The Moose Mountain iron deposit occurs in rocks of Keewatin age, the oldest series of rocks known in this part of the continent. The Keewatin is essentially an igneous complex, the predominant rocks being greenstones. The deposit or deposits at Moose Mountain may be briefly described as follows: On hill No. 1, there is an exposure of a lens of magnetite 300 feet by 100 to 150 feet. The ore has been proved in two drill holes 257 and 400 feet in length, run at angles of 45 and 60 degrees respectively. This deposit is being worked by a cut which is 75 feet lower than the top of the hill. In line with the larger axis of the lens, west by north one-half mile, another large ore body has recently been found 600 by 50 feet in size. East by south from No. 1 one-quarter mile, another promising lens is being opened up.

"Analyses of iron ores from the Hutton township ranges are as follows:

No.		Iron	Sulphur	Phosphorus	Titanium
		Per cent.	Per cent.	Per cent.	Per cent.
1	Eugene Coste's sample	51.45	.001	.058	None
	Prof. Coleman's report	62.64	.056	.011	"
2	Eugene Coste's sample	55.45	.010	.011	"
	Prof. Coleman's report	59.12	.008	.016	"
2	Extension E. Coste's sample	44.54	.020	.037	"
3	Eugene Coste's sample	59.75	.013	.072	"
	D. D. Mann's sample (Heys' assay)	55.75	None	.001	"
	D. D. Mann's sample (Hersey's assay)	53.07	.100	.014	"
4	Prof. Coleman's report	46.08	.006	.094	"
4(1)	E. Coste's sample	42.76	.015	.036	"
4(2)	"	55.24	.015	.055	"
4(3)	"	44.19	.002	.011	"
5	"	31.70	.026	.051	"
6	"	54.30	None	.025	"

Sixteen miles north of Moose Mountain a similar iron range is found at Burwash lake."

III.—Temiskaming

Temagami Mining and Milling Company

This company is developing a mispickel property at Grey's siding in the Temagami Forest Reserve about 3 miles north of Temagami station. A concentrating mill was put up about two years ago for treating the ore, but has not been much operated. This year a spur has been put into the mine, and it is proposed to ship a considerable tonnage of ore.

James Lake Pyrites Mine

Under the management of Ronald Harris shipments of pyrites have been made regularly from the above property during the last year. A spur has been built into the mine from the Temiskaming and Northern Ontario railway. The shaft has been sunk over 100 feet with considerable drifting and cross-cutting. The property is fully described by Mr. Fraleck in his account of Iron Pyrites in Ontario in this Report.

The silver mines of the Cobalt camp will be found fully dealt with in Prof. Miller's report, being Part II of this volume, hence it is unnecessary for me to mention them here, further than to say that they were duly visited and inspected with the view of seeing that the regulations contained in the Mines Act 1906 for their safe operation were being properly observed.

IV.—Eastern Ontario

Gold Mines

There are at present two companies engaged in development work on gold properties in North Hastings. The richness of the surface showings has led to a great amount of needless expenditure, particularly in the matter of building stamp mills and the erection of large and expensive camp buildings. With the erection of the new refining works at Deloro, there is a prospect of the Deloro mine being re-opened. The mines in the eastern section of the Province have suffered during the year from a scarcity of labor, particularly of skilled miners. The scarcity is due largely to the prospecting boom in the Nipissing district, as well as the increased demand for labor in that section, where the wages are largely in excess of those paid in other sections of the Province.

Star of the East

Since last inspection the management of the mine has been changed, Mr. J. A. Steele being now secretary-treasurer, and Mr. Brooks superintendent. At the time of inspection a mill run of 500 tons of ore was being made to thoroughly test the value and milling properties of the ore. Samples of the concentrates were being sent away to ascertain whether the gold could be extracted economically by the cyanide method. Very little development work has been done under ground since last inspection. The shaft, which is 213 feet deep, has had a cross-cut driven south 196 feet to cut what is known on the surface as the south vein. A drift has been driven west on the vein on this level a distance of 75 feet. Some drifting has also been done on the first level.

Instructions were given regarding riding in the bucket and also with regard to shaft and ladder way.



Shaft house, Star of the East gold mine.



Prospect shaft, Star of the East gold mine.

Golden Fleece

This gold property, situated on lot 25 in the sixth concession of the township of Kaladar, has been re-opened. In his report on the Eastern Ontario Gold Belt, in the Eleventh Report of the Bureau of Mines, Prof. W. G. Miller states that: "The deposit lies near the contact of the diorite schist and a conglomerate. The ore is found in association with the schist where it occurs in quartz in the form of a vein and in quartz more or less mixed with the schist. . . . The sulphide in the ore is pyrite. The schist which strikes southwestward contains quartz stringers through it for a considerable distance along the strike. Exposures of quartz also occur on the more northern part of the property. Very rich specimens of gold bearing quartz were obtained at the top of the shaft when the property was discovered. At the present time there is no difficulty in obtaining shows of gold by panning the quartz and impregnated schist. The deposit cannot be considered a high grade one. Any attempt to work it should be made on the assumption that it is a large low grade ore body."

A pit 35 feet deep has been sunk, and a 50-h.p. boiler, hoist and 3-drill compressor installed. Very comfortable camp buildings have also been erected. The work is under the direction of Mr. E. J. Cowain.

Eldorado Copper Mine

Much interest has been taken in this property on account of its being the only copper producer in Eastern Ontario. The smelter, which was blown in on the 25th of June, 1906, has been run at intervals since that time, the intermittent nature of its operations being accounted for by the development work not being far enough advanced to furnish the requisite supply of ore. At a depth of 75 feet the vertical shaft was discontinued, and all mining has since been confined to sinking on the ore body. The ore body occurs in a shoot about 36 feet in length by 7 to 10 feet in width. In sinking the body of the ore shoot was taken out and smelted. The total depth of the working is now 300 feet from the surface. The ore is hoisted by bucket on skid way placed on the southwest end of the ore body, which dips to the northeast at an angle of about 65 degrees. Stulls covered by heavy lagging have been placed at intervals of 25 feet in the stope. No drifting or cross-cutting has been done below the 150-foot level.

The attention of the management was called to the unprotected condition of the upper part of the incline shaft, and also to the location of the thawing house. The high pressure half of a 10-drill air compressor has been installed since last inspection.

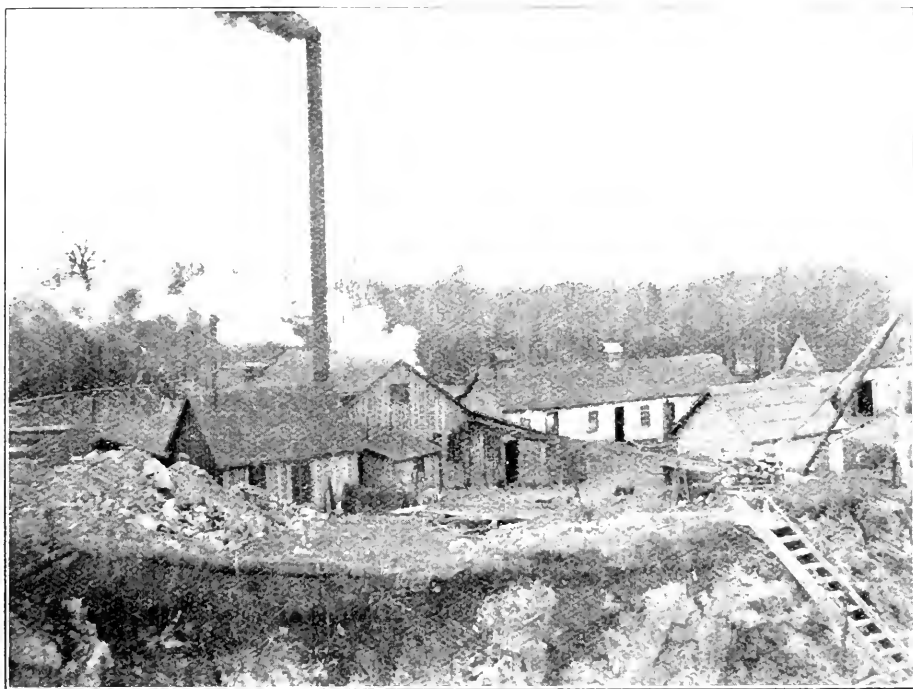
The furnace is located south of the shaft on the face of the hill. It is 4 feet in diameter, water-jacketted with solid cast steel crucible, and has a capacity of 50 tons of ore in 24 hours. The ore is very basic, as shown by the following analysis of a high grade sample:

	Per cent.
Copper.....	16.40
Iron.....	24.90
Sulphur.....	28.54
Ferric oxide.....	17.70
Lime.....	1.00
Magnesia.....	2.12
Silica.....	5.68
Undetermined.....	3.76

The flux required for the ore is silica, which is obtained from the adjoining property. An average charge for the furnace is as follows: Ore 750 lbs.; coke, 130 lbs.; low grade matte, 110 lbs.; silica, 135 lbs.; slag, 175 lbs.

The ore is not given any preliminary roasting. The matte and slag flow into a 3-ton fore-hearth from which the matte is tapped at intervals, and the overflowing slag is received in unlined iron settling pots.

The property is owned by the Ontario Copper Company, of which Cole Saunders is president. Mr. G. H. Hambly was in charge at the time of the last inspection.



Eldorado copper mine : surface works.



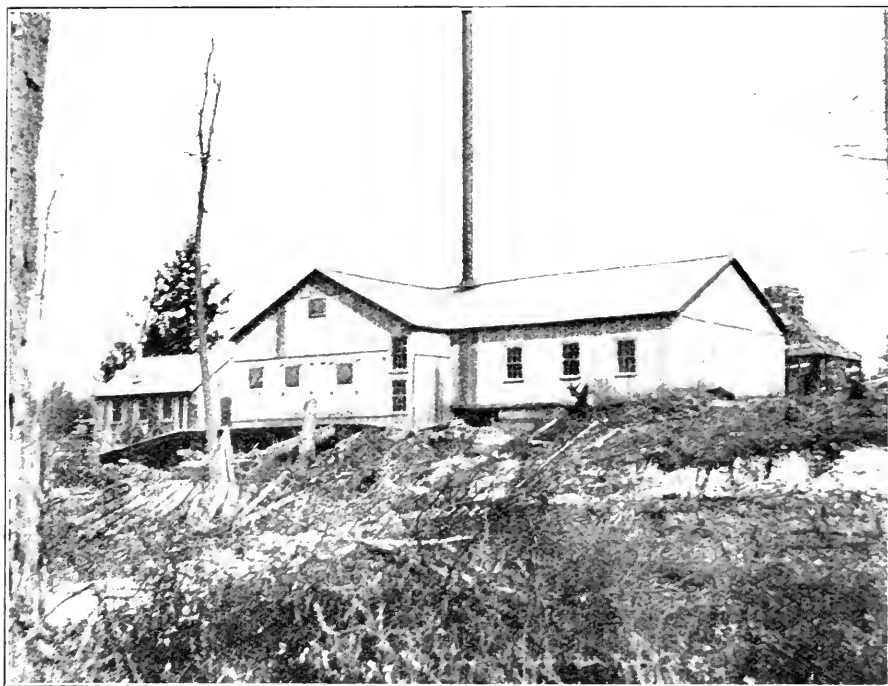
Copper smelter, Eldorado.

Lead Mines

There has been some revival of interest in the lead deposits of Hastings and Frontenac counties, due doubtless to the high price of lead. Following are brief notes on those properties which have been under operation:

Hollandia Mine

This property has been taken over by the Stanley Smelting Works and is being operated by them. The main shaft remains the same as at former inspection, namely 100 feet in depth. From this level drifts have been driven east on the vein 150 feet and west 75 feet. A raise was being put through from the east drift to connect with No. 2 shaft which is about 100 feet east of No. 1 vein. The concentrating mill was not in operation at the time of my inspection, as the mine had been unwatered only a short time, and no stoping had begun. A 4-drill straight line air compressor and a 100-h.p. boiler have been installed.



Frontenac lead mine, power house.

Mr. Cushman is manager of the company, and Mr. Burnette superintendent of the mine.

The Stanley Smelting Works located at Bannockburn, at the junction of the Central Ontario and the Bay of Quinte railway, have not been in operation for the last six months. The company contemplate moving their smelting works to the city of Kingston, where they have been granted certain concessions. This new site will be advantageous, as it is a lake port and is also near the Frontenac lead mine, which the company have acquired recently.

Frontenac Mine

The Frontenac lead mine was worked over thirty years ago, and was the first producing lead property in Ontario. It is mentioned by Mr. Henry G. Vennor in the report of the Geological Survey, 1866-1869. It has recently been taken over from the original owners by the Stanley Smelting Works.

Work during the first part of 1907 has been done on the surface showing about 500 feet west of the shaft, on what was formerly known as the back lead mine. Here a shaft 7 feet by 18 feet has been sunk a depth of 50 feet on a vein of calcite carrying galena and sphalerite, the percentage of the latter being small. The calcite vein has been traced for a considerable distance, and runs in an easterly and westerly direction, cutting across the granite and crystalline limestone. The latter occurs in wide masses, which generally have a strike of north to south, in some places being quite crystalline. It was noticed that where the limestone was highly crystalline, graphite was generally found disseminated through it, giving the limestone a bluish color. This resembles somewhat the crystalline limestone of North Hastings. At the back, or westerly lead mine, an 80-h.p. return tubular boiler has been installed and a 3-drill straight line air compressor.

At the No. 1 shaft, which is on the south half of lot 16 in the ninth concession of Loughboro, the work of pumping out had been begun. The old Cornish pump is being refitted and pumping will commence shortly. Two 100-h.p. boilers are on the ground ready for installation.

Mr. D. G. Kerr is superintendent.

Katherine Mine

The Katherine lead mine, situated on lot 7 in the second concession of the township of Lake, Hastings county, three miles northwest from Millbridge, was unwatered in 1906, and some work done on it by the Stanley Smelting Company. An air compressor and boiler were installed.

Richardson or Olden Zinc Mine

The Olden zinc mine is the only zinc property at present in operation in the Province. It was closed down temporarily during part of the winter of 1906, but was again opened in the spring of 1907. Since the last report on this property work has been confined chiefly to stoping out ore in Nos. 1, 2 and 3 shafts. Part of the low grade ore taken out was concentrated by means of hand jigs and the rest was put on the dumps for future treatment. A cable way has been put in connecting No. 2 shaft with No. 3 shaft, so that the ore can be hauled direct from the shaft to the mill, where the crushers are located.

Mr. J. Sullivan was foreman in charge, employing about 25 men.

Iron Pyrites

Development work in the pyrites mines of Hastings county has shown so much ore that the Nichols Chemical Company, the owners of some of the largest properties, have felt justified in building a chemical works for the manufacture of sulphuric acid, adjoining what was formerly known as the Hungerford pyrites mine.

Hungerford Mine

The property known as the Jarman pyrites mine, near Bannockburn, which has been operated by this company for some years under lease from the owner, has been closed down and the lease relinquished by the company. All their work is at present being done on what was known as the Hungerford pyrites mine on lot 23 in the twelfth concession of the township of Hungerford, about 5 miles east of Tweed and adjacent to what is now known as the town of Sulphide.

An incline shaft on the south vein has been sunk to a depth of 320 feet, with levels at 100 feet, 200 feet and 300 feet respectively. The shaft dips to the south at approximately 60°. Cross-cuts have been driven north from the shaft to cut the middle vein

and the north vein on each of the levels at a distance of 60 feet and 115 feet. On the first level north vein drifts have been driven east and west on the vein 220 feet and 140 feet respectively. At the end of the east drift a raise has been put through to the surface. The vein on this level, where it has been cut out to the full width, is about 20 feet wide. Some ore has been stoped from this vein. On the second level south vein drifts have been driven east and west on the vein 210 feet and 130 feet respectively. A raise has been put through from where the cross-cut from the shaft cuts the vein on the second level, to the first level. On the third level the cross-cut has been driven north, cutting the north vein, but no drifting had been done at the time of my inspection. A survey had been made for a tramway from the mine to the burning house at the works, which are distant about 800 feet south.

The plant at the mine was being doubled by the addition of the machinery taken from the Jarman pyrites mine.

Acid Works

The sulphuric acid works of the company are located about 500 feet from the main line of the Canadian Pacific railway, from which a spur line has been constructed to the works. The plan of the works and process is similar to the works of this company at Capelton, Quebec, the acid being made by the contact process, the method being a secret one held only by this company. The power house, gas tanks, burner building, process building and nitric building are all separate. It is expected to treat at first about 25 tons of ore per day. The works were put in operation about July 1st, 1907.

Mr. Pritchard was superintendent of the mine and works at the time of my inspection.

Canada Mine

The property formerly known as the Oliver property on lot 26 in the twelfth concession of Hungerford, has been purchased by the Canadian Pyrites Company, and is being operated by them. A shaft is being sunk on the vein which is on an incline of 50°. It has now reached a depth of 110 feet, and drifting has begun on the vein at the 85-foot level. The vein has a strike east and west. This property adjoins the mine operated by the Nichols Chemical Company. Mr. W. A. Hungerford, formerly of Deloro, is superintendent.

A small prospecting plant has been installed.

British America Mine

Work had temporarily closed at this mine at the time of my inspection. During 1906 a considerable tonnage of ore was mined and shipped. Great trouble was experienced in keeping the mine free of water.

Iron Mines

The iron ores of Eastern Ontario have had many vicissitudes of fortune, but the prospects for a large production of ore, principally magnetite, have not been better in many years than at the present time. This improvement in the situation is largely due to the development of the Mineral Range properties near L'Amable.

Radnor Mine

This mine has been a producer of iron ore for the last four or five years. During last year steady shipments were made. In the spring of 1907 a more energetic development of the deposit was undertaken. Mr. R. W. Seelye, superintendent of mines for the Lake Superior Corporation, was appointed consulting engineer, and Mr. L. L. Bolton made resident superintendent. The management have decided to open out the



Childs mine, Mineral Range Iron Mining Company.



Mineral Range iron mine. Ore after blasting.

deposit, and in order to do so it was necessary to remove a great deal of surface covering. This is being begun from the northwesterly side of the property, which will leave sufficient room for ore piles below the level at which the ore will be taken out. The ore is shipped by wagon from the mine to the railway station at Caldwell on the Canada Atlantic railway.

Mineral Range Mines

During the last year the Mineral Range Iron Mining Company have developed their No. 3 and No. 4 mines from prospects to shipping mines. This has caused an increased activity in this district both in prospecting and in money coming into the section to develop the properties. No. 3 and No. 4 mines, on adjoining lots, were thoroughly drilled and tested before shipping was commenced. As these properties were situated four and a half miles from the Central Ontario railway, it was necessary to build a branch line from the main line of the Central Ontario railway to the mine. As a result a charter was obtained for the Barry's Bay and Bessemer railway, and the first part of the road built from the junction about one-quarter of a mile south of L'Amable station to Bessemer, a distance of $1\frac{1}{4}$ miles.

At No. 4 pit a rock house has been constructed 50 feet in height. The ore from No. 4 pit is hauled up by means of a skip and dumped direct into a 1,200-ton Gates gyratory crusher. The ore from the crusher passes to bins which deliver direct to the cars. No. 4 pit is at present worked as an open cut. The face of the ore body above the floor of the open cut is about 30 feet high by 40 feet in width. This has been worked back from the shaft a distance of 100 feet. The ore body dips to the east at an angle of about 60 degrees. The ore is sorted in the pit before loading on the cars. The ore in carload lots from this pit will run from 55 to 58 per cent. in metallic iron and is low both in sulphur and phosphorus. A shaft is being sunk from the level of the open cut in the ore to give additional ore faces to work from.

At No. 3 pit, which is at present about 25 feet deep, the ore is also being taken out by open cut work and is hoisted by derrick and dumped direct on to cars, which are hauled down to No. 4 shaft house and the ore put through the crusher. No work is at present being done at No. 2 pit or the Childs mine, but it is the intention of the company to begin work on these two properties as soon as practicable. A saw mill has been built near the mine at the foot of the lake and all lumber used at the mine is sawed here. A number of houses have been built for the workmen.

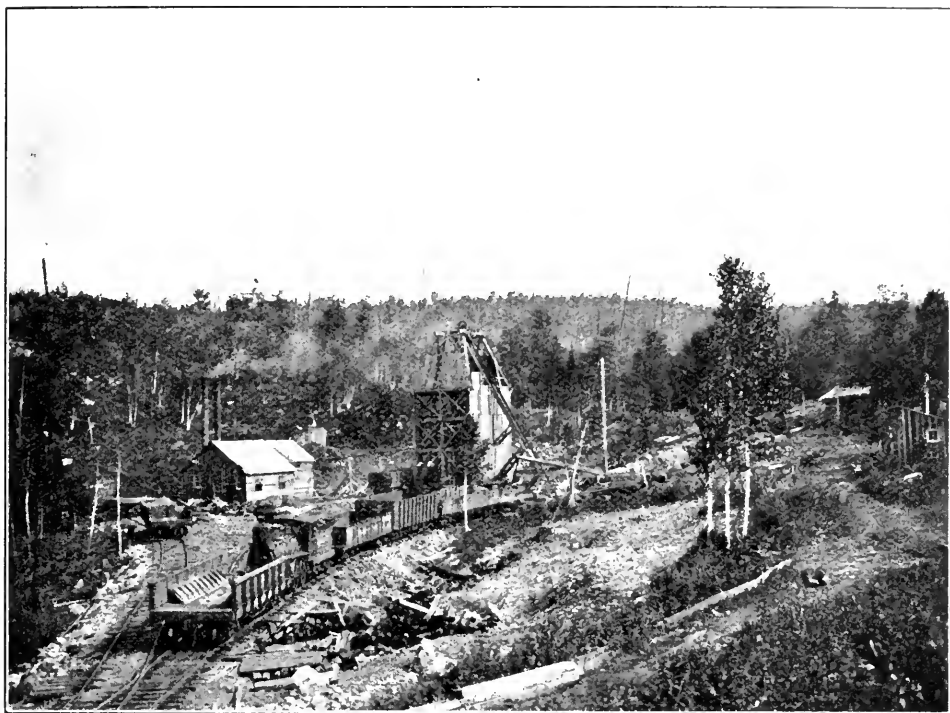
Mr. H. C. Farnum is the manager of the company, and Mr. Patterson superintendent. About 100 tons of ore are shipped daily from the mine. It all goes at present to blast furnaces at Midland, Radnor and Sault Ste. Marie.

Marble

The marble quarry opened up last year near Bancroft by the Trenton Granite and Marble Company was not in operation at the time of my inspection. A spur has been built from the railway to the mine and channelling and cutting machines installed. It is reported by the management that operations will shortly be renewed. Mr. Sergeant was in charge of the work.

Corundum

The corundum deposits of Renfrew and Hastings counties are being worked by the two companies who have between them developed a considerable industry in producing grain corundum for abrasive purposes.



Railway siding, Mineral Range Iron Mining Company.



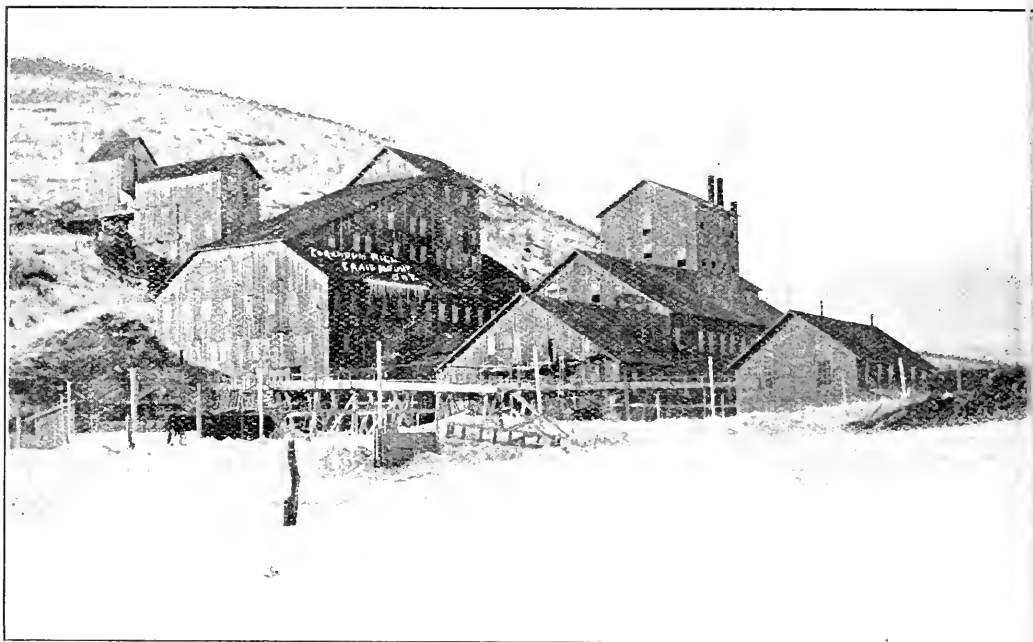
Mineral Range Iron mine ; shaft and crusher house.

Canada Corundum Company

The production of refined corundum from the company's concentrating mill at Craignont has been largely increased during the last year, while the production of corundum bearing rock from the quarries has been more than doubled. In April 1907, 7,000 tons of ore were mined and milled. This gave a daily production and mill run of about 300 tons. The increased production at the mill allows a much lower grade of ore to be handled profitably. Several new improvements have been perfected in the mill by the manager. One of these is the electrostatic separator used for taking out the pyrites.

On the hill the same system of open cut work is still in vogue as that described in former reports. Several new openings have been made on the face of the hill, and good corundum bearing rock extracted.

About one mile west of the old workings on the same hill, an opening has been made and considerable ore taken out and hauled to the mill during the winter by sleigh. This working is called the Klondyke.



Concentrating plant, Canada Corundum Company.

On the York branch of the Madawaska, in the township of Monteaagle above Foster's rapids, the company did considerable prospecting and stripping during the summer of 1906. This work has shown up a very good deposit of corundum.

About 200 men are employed in the mine and mill. Mr. H. E. T. Haultain has been promoted to the position of general manager of the company.

Ashland Emery and Corundum Company

The Ashland Emery and Corundum Company have been prospecting several locations in the vicinity of their mill during the last year. At present they are prospecting lot 10 in the twelfth concession of the township of Carlow. Ore is brought to the mill by wagon a distance of about three miles, where it is concentrated and made ready for

shipment. On account of the difficulty of transportation to the mill, the shipments are very irregular. In the mill dry crushing is used and dry and wet concentration.

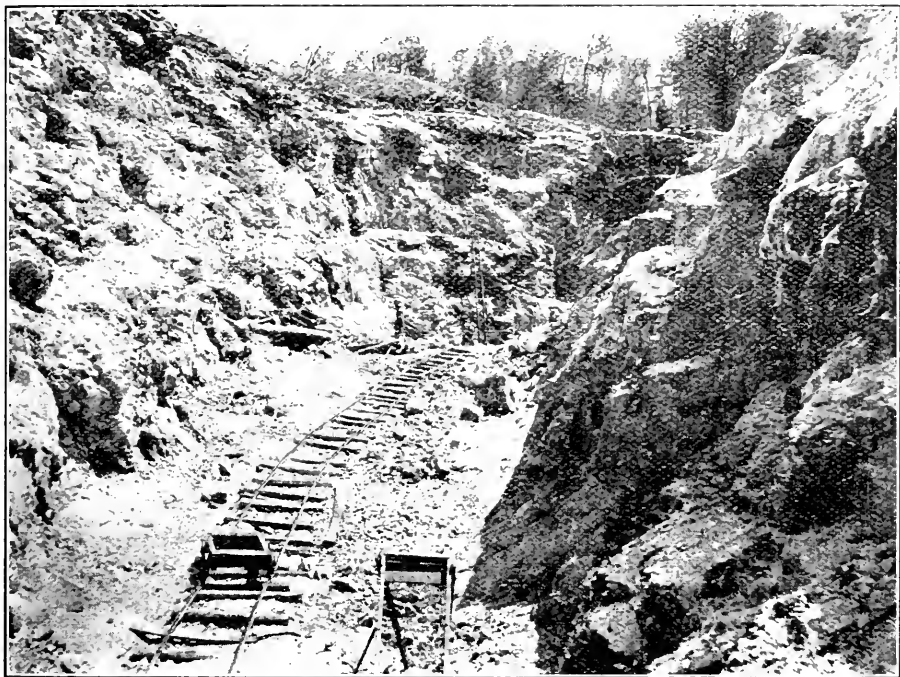
Mr. W. Mackie is in charge of operations for the company.

Feldspar

Frontenac county still leads Ontario in the production of feldspar. Chief among the shipping mines is the Richardson mine, which produces 90 per cent. of the whole production for the Province.

Richardson Mine

This mine is under the same management and ownership as mentioned in last report, namely, the Kingston Feldspar Company, with Mr. M. J. Flynn as superintendent. The same system of working is still in use as that formerly described. A sump 30 feet deep was sunk during the winter, and 12-foot stopes are being carried



Richardson Feldspar mine.

back from sump to No. 1 and No. 2 pits. The northeasterly end of No. 2 open cut has been extended and a 25-foot face of feldspar opened up. A quantity of quartz on the hanging wall of the northeasterly pit was removed during the winter. This quartz was used chiefly for grading the tramway recently constructed. The feldspar appears to be dipping quite uniformly to the southwest. The pit at its greatest depth is now about 80 feet over all.

A new tram has been constructed from the mine to the lake, a distance of 1,300 feet. The cars are hauled by team up a slight grade to the top of the hill, where by a system of balanced hoisting the cars are run down grade to the barge on the lake, the empties being hauled up by the loaded cars. A drum with friction brake is used for regulating the speed. The old system of hauling by teams from the mine to the lake is thus dispensed with. The other system of lake haulage by barge and tug to the railway siding at Glendower, remains as formerly described.

Border Mine

The Border mine on the west half of lot 5 in the twelfth concession of the township of Portland and two miles east of Verona, has been a small producer of feldspar during the last two years. Here a pegmatite dike cuts across the granite gneiss in a northeasterly and southwesterly direction. Large masses of feldspar and quartz are developed in the dike, from which feldspar is sorted and shipped. The feldspar is mined by open cut work.

A number of other small properties are being developed in Frontenac county, but none have reached the shipping stage.

Mica

The mining of mica in Ontario dates back to about the year 1860, when a quantity of large and carefully selected sheets from lot 17 in the ninth range of the township of North Burgess was sold in Paris for the use of the French navy, at a price of \$2 a pound. Some of this mica was in sheets twenty inches square, or larger. At this time, 1860, and for the following thirty years, mica was used chiefly for stove fronts, lanterns, lamp chimneys and also instead of glass in the windows of ships of war, to save breakage from concussion. The production of mica from the sixties until the beginning of the nineties was chiefly as a by-product of apatite. These two minerals are very intimately associated, and during that time there was a large trade in apatite, with a rather small demand for mica, and then only for the large sizes. Between 1890 and 1895 mica, particularly phlogopite, or amber mica, was used more extensively in the manufacture of electrical apparatus, which gave an impetus to the industry in Ontario. Prior to that time the small sizes of mica had not been marketable, but this new industry created a market for material of which a large quantity had already been mined and thrown away as useless. This has, therefore, been re-sorted, and the small sizes previously thrown away saved and sold. The sizes of amber mica now asked for by the buyers and the approximate price which the cleaned mica will bring, are the following:

1 in. x 1 in.....	5-6 cents per pound.
1 in. x 2 in.....	10 "
1 in. x 3 in.....	20 "
2 in. x 3 in.....	45 "
2 in. x 4 in.....	65 "
3 in. x 5 in.....	75 "
4 in. x 6 in.....	100 "

Loughboro Mining Company

The mines formerly owned by the General Electric Company have been transferred to the Loughboro Mining Company, of which Mr. G. W. McNaughton is manager.

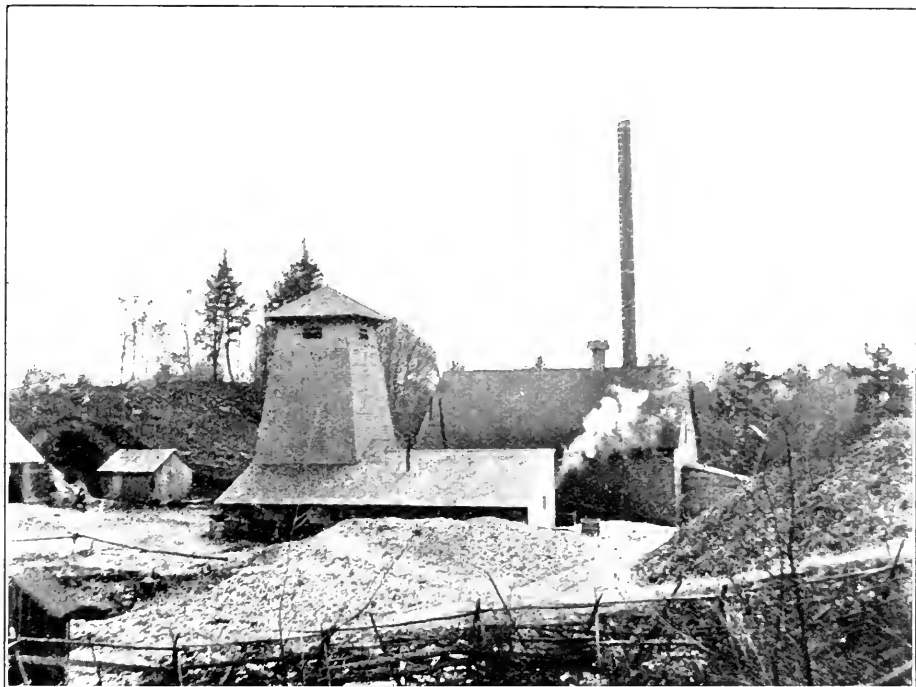
One of these properties, the Lacey mine on lot 11 in the seventh concession of Loughborough township, has proved a steady producer, and has probably produced more mica than any other property in the Province.

The first work was done on what has since been known as the Lacey mine in 1884, when a shaft was sunk on the vein. This was owned at that time by Messrs. Smith and Lacey, who took out a large tonnage of an exceedingly good grade of mica. The pit was sunk to a depth of about 130 feet, and the vein stoped out for a distance of about 130 feet in length, with an average width of 10 to 15 feet. This pit was abandoned in the early nineties, and the mineral right of the lot sold to the General Electric Company of Schenectady, N.Y.

In 1899 a new discovery of mica was made about 200 feet southeast of the old workings. This has been operated continuously since that time and has been a large producer. It has been worked to a depth of 185 feet and longitudinally over 200 feet. The vein in some places is 20 to 25 feet in width. On the first level at a depth of 60 feet

the drift has been run southeast on the vein a distance of 175 feet. On the fourth level at a depth of 117 feet two drifts run southeast, the easterly drift being 150 feet and the westerly drift 135 feet in length. Northwest of the shaft the mica has been stoped out for a distance of about 50 feet. On the second level a cross-cut has been driven a distance of 55 feet to cut a parallel ore body, which thus lies between the old and new workings. This body is about 75 feet in length, 60 feet in depth, and has an average width of about 8 feet.

A shaft has been sunk on the hill northeast of the present shaft. It is proposed to connect this shaft with the first level. A shaft is also being sunk about 20 feet from the air shaft. From this shaft an open cut is to be made to take out the mica from the first and second levels to the surface.



Lacey mica mine.

The mica, which is a phlogopite, occurs in a vein matrix of calcite and pyroxene. The phlogopite is well crystallized, sometimes occurring in crystals 6 feet in diameter, and sometimes 4 to 5 feet in thickness. The wall matter surrounding the vein is essentially a mica pyroxene schist. The bedding of this rock cuts the vein at right angles. This is very marked on the fifth level of the mine, where the bedding occurs at an angle of about 20 degrees from the vertical and at right angles to the vein.

The mica from this mine is shipped to the General Electric Company's shops at Ottawa for cleaning, splitting, etc.

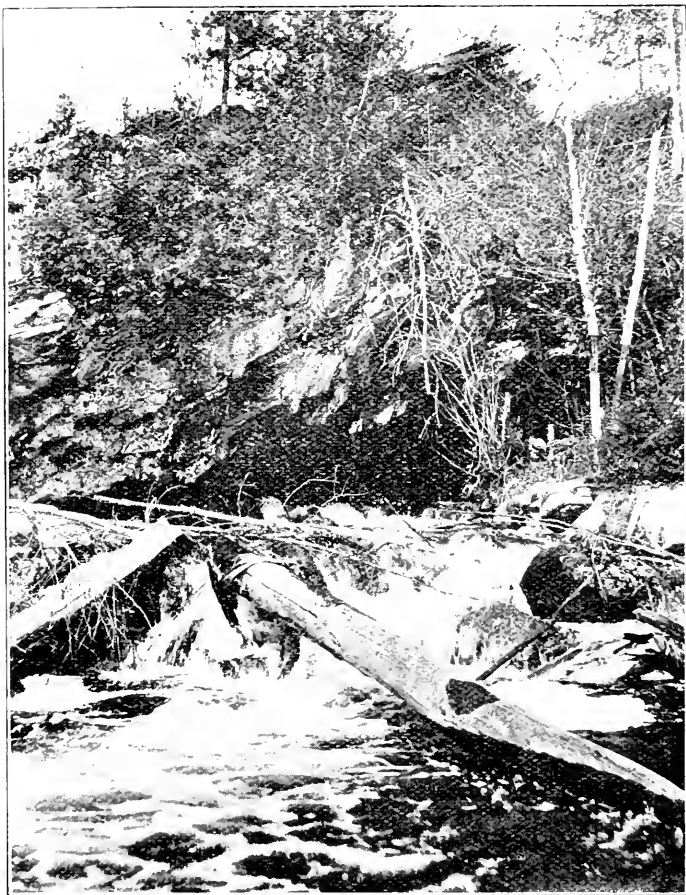
Hanlan Mine

The Hanlan mine owned by the Loughboro Mining Company, was re-opened this year after being closed down for some time. It is situated on lot 11 in the sixth concession of North Burgess, and is probably the best example of a true fissure vein of any amber mica mine in the Province. Here the vein has been mined for a depth of 120 feet, and a length of about 200 feet, without a break in it. The vein is quite uniform in width, averaging about 6 to 8 feet, while in some places it widens out to about 15

feet. The vein matrix, as is usual, consists of calcite and pyroxene, with occasional pockets of apatite. The mica in parts is well crystallized, while in adjacent parts it is quite badly crushed. The wall rock is a mica pyroxene schist, but not enough cross-cutting has been done to show whether there is any distinct bedding. In other respects it is quite similar to the corresponding mica pyroxene schist at the Lacey mine. This vein strikes east and west, cutting the granite gneiss of Laurentian age, and dips to the south at an angle of about 75 degrees to the horizontal.

The mica is rough cobbled at the mine and then shipped to the General Electric Company at Ottawa for further treatment.

Mr. S. Cordick is foreman, employing about 15 men.



Cave worn by water in crystalline limestone near Cragmont.

The Canton mine in South Burgess, originally owned and worked by Webster and Company, but taken over from them by the General Electric Company, is now being worked by the Loughborough Mining Company. The Company have a diamond drill at work exploring the property.

Smith Mine

This mine is situated on lot 13 in the fifth concession of the township of North Burgess, and is owned by the Dominion Development and Improvement Company. It was originally opened up for apatite, but after a pit had been sunk about 25 feet on

the vein, mica crystals were found throughout the apatite. The apatite is soft and granular, thus giving the mica a favorable matrix in which to crystallize out freely. The vein in some places is 10 feet wide, consisting of apatite, calcite and mica. It dips at an angle of 50 degrees to the horizontal. On each side of the vein is a mica pyroxene schist some few feet in thickness, which in turn cuts through the granite gneiss. This belt of mica pyroxene schist can be traced for some distance along the surface, where at different places a little mica has been taken out. The association of the pyroxene rock with the mica veins is very marked over the whole mica area. In fact, it is very rare to find a large healthy deposit unless it is enclosed by this rock.

James Thompson is foreman, employing about 20 men.

On lot 12 in the sixth concession of North Burgess, being the lot between the Martha mine on the west and the Hanlan on the east, Edward Watts of Perth and associates are working some small surface outcrops.

On lot 13 in the seventh concession of North Burgess, directly south of the Hanlan, Mr. Terry Smith has started opening up a surface show. Considerable work was done on the Martha mine last year.

Brockville Mining Company

About three miles from the town of Elgin, on lot 7 in the sixth concession of Bastard township, county of Leeds, the Brockville Mining Company are working a property which is of interest in that it occurs some distance from any other workable deposit. The mode of occurrence of the mica is also unusual. The mica is a very dark amber, almost verging upon a biotite. The pit has been sunk to a depth of 85 feet, and is 40 feet in length. The vein is about four feet in width and dips at 45 degrees to the horizontal. The vein material is composed as usual of calcite and pyroxene, the mica crystals being crystallized throughout. The main difference between it and the larger mica deposits in the Province is that there is no (what the miners term) mica rock lying along each side of the vein. This mica rock is generally a mica pyroxene schist, which occurs between the vein and the granite or granite gneiss. At this particular deposit the vein cuts the country rock, which is a very dark hornblende granite, thus leaving the mica crystals lying right against the granite. On account of the hardness of the rock, the mica has been crushed considerably on crystallization, and the vein is more liable to be in the form of lenses.

Mr. H. Stanger is superintendent, employing a force of 15 men. A new 40-h.p. boiler has been installed. The mica is shipped to Perth to be cleaned.

Bobbs Lake Mine

On the west side of Bobbs lake Messrs. Stoness and Kent are working a mica property which was closed down during the winter. The main pit is 60 feet deep and about 35 feet long and 6 to 7 feet wide. The vein matter is calcite and pyroxene enclosed on both sides of the vein by mica and pyroxene gneiss. The veins are running east and west. A number of parallel veins have been exposed on the property. The mica is rough cobbled at the mine and shipped by way of Olden to the Kent Bros.' mica shop at Kingston.

Mr. J. Stoness is manager of the property.

Freeman Mine

The New York and Ontario Mining Company are working on the north end of the Freeman property, which is lot 7 in the ninth concession of Loughborough township. A pit about 50 feet deep and 40 feet long has been sunk on the vein. The vein matrix is pink calcite, which contains the crystals of amber mica. The deposit has been worked by open cut, the hoisting being done with derrick and small hoist. A small

boiler supplies power to the hoist and drill. About twelve men are employed at the property under superintendent S. Orser. The mica is rough-cobbed and cleaned at the mine.

Amey Property

Adjoining the Freeman mine Mr. H. Amey is engaged in opening up a mica property for Mr. Austin, of Toronto. The open cut is 60 feet deep by 40 feet in length. Hoisting is done by horse whim and derrick. The occurrence is similar to that described above.

Mica Trimming Works

At the present time the preparation of mica for the trade has created quite an industry in Eastern Ontario, especially in Ottawa, which is quite favorably situated as the centre of the mica producing sections of Ontario and Quebec. In Ottawa two



Mica prospect, S. Orser, Loughborough township.

of the large consumers, The Laurentide Mica Company (Westinghouse) and the General Electric Company, have built factories in which they employ from 500 to 600 girls in the preparation of the mica for the market. The preparation consists of cleaning or breaking off all the ragged or broken edges of the run of mine crystals, and splitting the mica down to about one-eighth of an inch in thickness, and grading it to the different marketable sizes. This is then knife-trimmed, and taken to the tables for thin-splitting. The chief and essential characteristic of mica is its highly perfect basal cleavage, permitting the mineral to be split exceedingly thin. This characteristic is made use of in thin-splitting. The purpose of the mica being thin-split is to enable it to be built up into what is known as micanite. Most of the mica mined in Ontario is shipped to the United States.

The General Electric Company have built a new factory on the corner of Bridge street. This factory is very modern in every way. The question of ventilation being

an important factor in the health of the employees on account of the dust, fans have been so placed that the dust is drawn down through pipes and thus prevented from floating in the air in the rooms. The company will employ about 400 hands.

The Laurentide Mica Company's factory on the corner of Queen and Bridge streets, employ a force of about 500, the majority being girls.

Kent Bros. of Kingston have removed their factory from Ottawa and have leased the building on Brock street, Kingston, formerly used as McGowan's cigar factory. A large force are at work, the mica trimmed being brought from their mine near Ottawa and also from their Bobbs lake mine.

Eugene Munsell and Company, at 400 Wellington street, Ottawa, employ a force of about 75 girls under superintendent F. Fillion.

Norman B. Holland at 427 Sussex street, Ottawa, employs about 75 girls in his mica works.

The other smaller operators in Ottawa are the Wallingford Mining and Mica Company on Sussex street, R. Blackburn on Sussex street, Webster and Company and the Comet Mica Company on Wellington street. All these concerns buy mica from the smaller producers in Ontario and Quebec.

Talc

The Henderson talc mine is the only producer of talc in Ontario. It produces yearly about 1,000 tons, which at the quoted market price of 15 to 25 dollars a ton makes a fairly good industry. Mr. S. Wellington of Madoc has a contract for taking out 1,000 tons yearly, consequently the mine is only worked for a short time during the summer.

Silver King

A silver property is being worked by an American syndicate about 7 miles north of Queensboro. A shaft has been sunk to a depth of 60 feet, showing up some fairly good values. Captain Williams is in charge.

OIL AND GAS IN KENT

BY C W KNIGHT

Acting under instructions from Thos. W. Gibson, Deputy Minister of Mines, the writer spent the second week of July 1907, in the new Tilbury and Romney oil and gas fields, Kent county. The city of Chatham, served by both the Canadian Pacific and Grand Trunk railways, is the most convenient railway point in going from Toronto west, and is distant from the latter city 183 miles (via Hamilton).

Location of Field

Chatham is some ten miles northeast of the Tilbury field, while the Romney pool is about seven miles southwest of the latter. Both fields derive their names from the townships in which they occur. They lie between lake St. Clair on the northwest and lake Erie on the southeast.

While visiting the district it is the custom of some operators to make their headquarters at Chatham and drive thence to the fields. The town of Tilbury, six miles west of the field, is also used by oil men as headquarters. At the time of my visit the majority of the operators were said to be there. The post office of Fletcher is a central point in the Tilbury field; there are one or two boarding houses here where accommodation may be obtained. The village of Merlin (two miles east of the Tilbury field) on the Pere Marquette railway, may also be used as headquarters by anyone desiring to see the new region.

All of the country around the Tilbury field is cleared and is regarded as good farming country. At the Romney pool, however, there is much bush, but the roads are numerous.

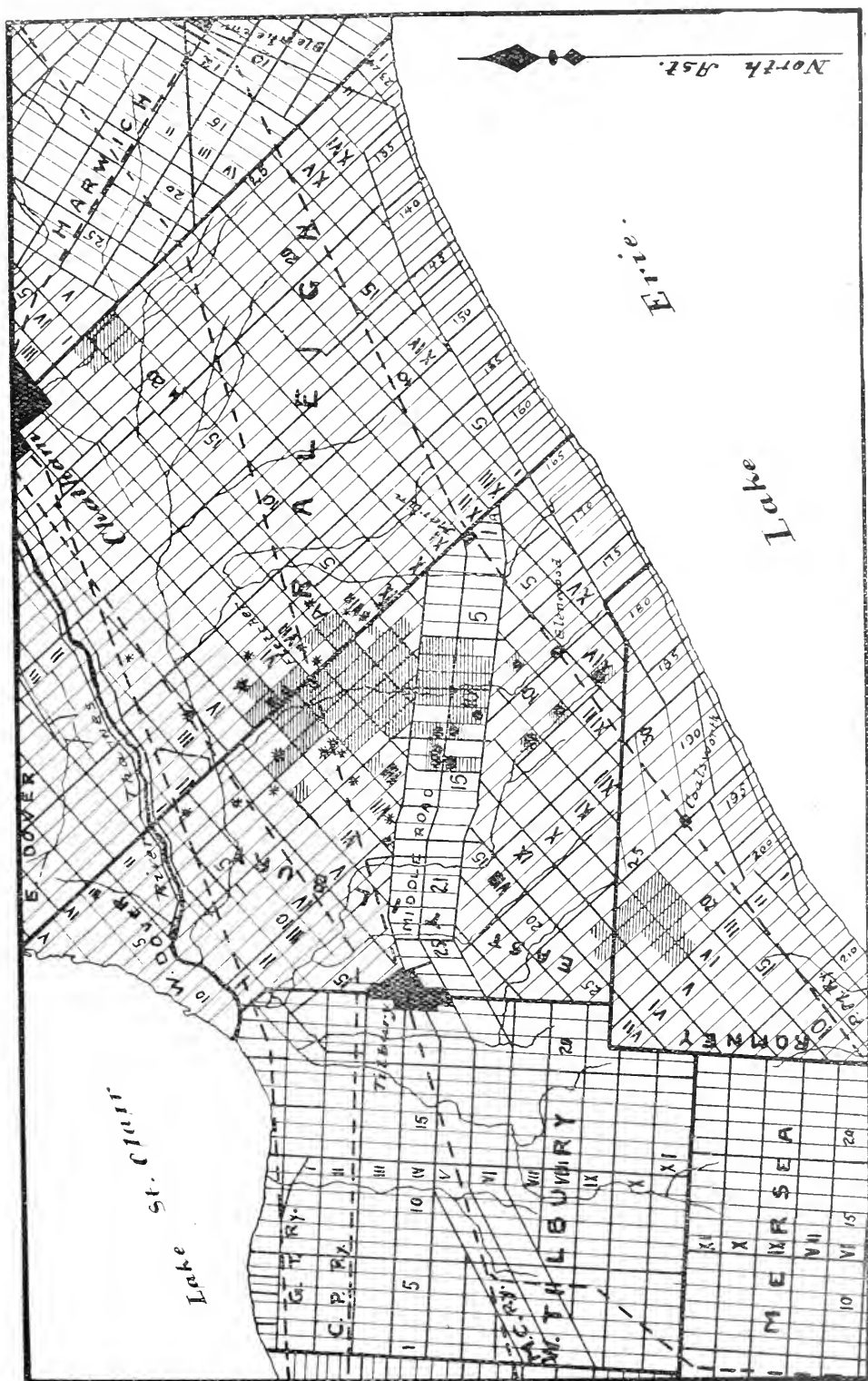
It was not possible to visit every farm which is producing oil. Further, the nature of an oil field is such that it is necessary in a hurried examination to get a great deal of the information secondhand from men actually operating. The country is entirely drift covered, so that any data regarding the underlying formations comes from the logs of wells. These are, unfortunately, not fully recorded.

The Fourteenth Report of this Bureau contains accounts of the oil operations in Kent county up to March, 1905. The Bothwell field in the northern part of Zone township was producing from 5,000 to 6,000 barrels a month at that time. The "Gurd gusher," on lot 18 in the twelfth concession of Raleigh township, and the Wheatley field in Romney township also, at one time, produced some oil.

The First Strikes

Within the last eighteen months, however, there have been very important developments of both oil and gas in Kent county. The following account of the early work is quoted from a paper in the Journal of the Canadian Mining Institute, March, 1907, by Mr. Eugene Coste:

"Oil was first struck in the new Tilbury field in December 1905, on the John Kerr farm in the northwest part of lot 10 of the Middle Road, North Range of the Township of Tilbury East, in the County of Kent, Ontario. The first well was drilled by the Acme Oil Company of Detroit. This company had been operating unsuccessfully in the narrow Leamington pool in the adjoining county of Essex. Before finally abandoning its venture in oil it decided to take another chance, and this time of a purely "speculative" nature, as the location selected was in an entirely new and undeveloped territory. As luck would have it, it turned out to be a winning throw. At the depth of 1,360 feet a rather strong gas vein was struck; then another at 1,375 feet; then the first oil pay with more gas at 1,385 feet; then a second oil pay at 1,410 feet, and a third one at 1,430 feet. A little below that some salt water was found, and the drilling was stopped at 1,450 feet. The well after the shot started to flow at the rate of 40 barrels of oil per day, the gas being quite strong, about half a million cubic feet per day.



Plan showing East Tilbury and Romney oil and gas fields, Kent County, Ontario. Shaded parts, approximate oil and gas area. Gas wells—• Dry holes—x Scale, 3.5 miles 1 inch.

"The second well was drilled in at the end of March 1906, on the Janes farm about three-quarters of a mile southwest of the first well. It struck gas and oil at about the same depths, but it proved to be a small well, not starting at better than eight or ten barrels per day after the shot.

"The third well was completed on April 6th 1906, on the J. Smith farm, half a mile southeast of the first well, and it started at the rate of sixty barrels per day after the shot; the first gas was struck at 1,363 feet and the first oil at 1,393 feet, the second oil at 1,418 feet and the third pay of oil, which was the best, with some salt water, at 1,430 feet.

"The Romney oil field, or rather pool, as it is yet only about three-quarters of a mile long and only a few hundred feet wide, is situated some seven miles southwest of the Tilbury field in the north part of lots 21, 22 and 23 in the fourth concession of the township of Romney, Kent county, Ont. It is only a few months old, and there are now seven producing wells in it, several of which came in as very large wells, making each over 1,000 barrels per day of oil."

The usual agreement which the operators have made with the farmers is that the latter shall receive a royalty of one-eighth of the output, the operator being allowed to drill where he pleases and to erect such buildings as may be necessary. In the case of some of the more recent leases, in addition to the one-eighth royalty, a bonus of several hundreds or thousands of dollars in cash has been paid, and the operator has been required to place his pipes and surface rods in such locations as would interfere as little as possible with farm operations.

Towards the end of 1906 and during the early months of 1907 there were said to be about 25 drilling contractors at work, each operating from one to three "strings" (separate drilling outfits) or about 55 strings in all. At the time of writing drilling operations had fallen off, and the estimated number of drilling outfits was 20. As it takes about a month on the average to drill a well, this means that 20 wells a month are being added to the number already in existence.

It is difficult, unless one should go over the field in detail, to learn the exact number of wells that have been drilled in Tilbury. In March 1907, there were said to be 150 wells drilled in, of which only about four were dry.¹ On July 1st the number of producing wells was 235. Besides these there were 33 dry holes and 26 new wells being drilled. In the Romney pool, at the same date, there were 47 wells, of which 24 were dry. The percentage of dry holes in the latter field is seen to be much higher than in the Tilbury field.

Oil Production

The production of oil from the Tilbury and Romney fields is given by Mr. C. O. Stillman of the Imperial Oil Company, Sarnia, as follows. This company buys all the oil from both fields.

East Tilbury:—

No. of bbls. ² from December 1905 to end of June 1906	4,000
July	4,315
August	13,897
September	14,651
October	23,879
November	26,558
December	28,101
1907	
January	29,172
February	26,098
March	29,600
April	31,055
May	35,004
June	35,654

It will be seen from these figures that the increase has been rapid from the beginning. Mr. Stillman considers that there is room for a considerable number of new wells in the proven area.

¹ Journal Canadian Mining Institute: Paper by Eugene Coste, March meeting, 1907.

² Throughout this report 1 bbl. contains 35 gallons.

Romney :—

1907	
January	2,871 bbls.
February	5,939
March	11,104
April	9,685
May	5,534
June	3,163

The rapid rise and fall in production is striking. There are several reasons given by oil men and operators for this. Some companies have shut down on account of a lack of fresh water for their boilers. Up to the present, water in the farmers' drainage ditches has furnished some of the supply, but this source is becoming exhausted with the hot weather. Some oil men have also suspended operations until natural gas can be piped in from the Tilbury field. The Romney pool has little natural gas, and the majority of operators have been using coal or oil for fuel. Some wells are said to be pumping considerable salt water, which is probably another cause for the falling off in production. But the main cause is the ceasing of drilling in of new wells. At the time of my visit there was only one new well being drilled.

The Romney oil is shipped from Coatsworth on the Pere Marquette railway.

The following table gives the total receipts of crude oil from all sources in Ontario received by the Imperial Oil Co. for the first six months of 1907. These figures include also the Tilbury and Romney fields.

January	60,850 bbls.
February	56,770
March	64,081
April	69,945
May	71,062
June	68,642
Total	<u>391,350</u>

This does not include some oil which is bought by other buyers, so that the actual total production for Ontario would be higher than these figures indicate. If this total be compared with the Tilbury and Romney output, it will be seen that these two new fields have produced for six months of 1907 considerably more than half for all of Ontario.

Mr. Stillman estimates the production from both the Tilbury and Romney fields at 30,000 bbls. per month for the next ten months. The explanation of this anticipated reduction lies in the fact that there has been a falling off in the drilling of new holes. It is necessary for Mr. Stillman to make such an estimate, because the capacity of the Sarnia refinery being 75,000 bbls. per month, he must import from the United States the difference between the Ontario production and the capacity of the refinery.

The Price of Crude Oil

The price of oil per barrel varies little from month to month. Practically the only purchaser is the Imperial Oil Company at Sarnia, Ont. The Tilbury crude oil in July brought the operator \$1.16 per bbl.; the Romney oil, 84 cents per bbl. In addition to this there is a Government bounty of 52½c. per bbl.

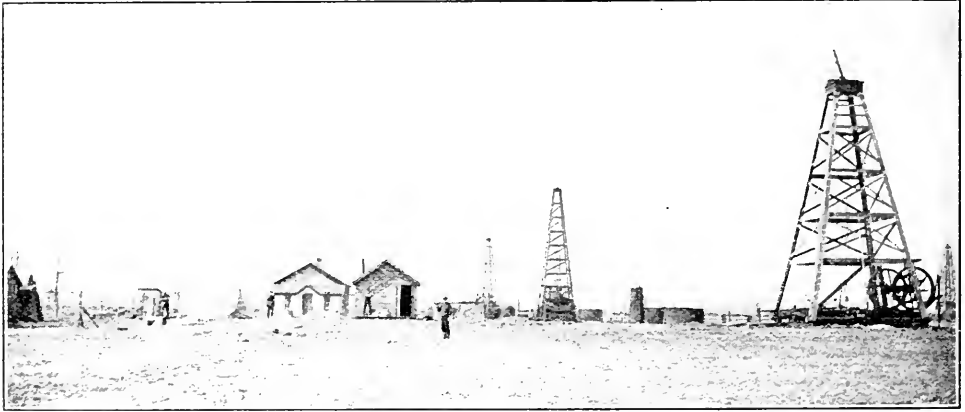
The following quotation from the "Chatham Oil and Gas Derrick," May 11th, 1907, shows how prices of crude oil vary at different points in Canada and the United States. The price given for Tilbury and Romney includes the Government bounty.

	Per bbl.
East Tilbury	1 6¼
Romney	1.42½
Pennsylvania	1.78
Tiona	1.78
Corning	1.14
New Castle	1.22
Cabell	1.22
North Lima .....	.94
South " .....	.89
Casey, Ill .....	.68

	Per bbl.
Indiana.....	.89
Princeton, Ind.....	.68
Kansas and Ind. Ter. 32 and above.....	.41
Somerset.....	1.20
Ragland.....	.70
Corsicana, light.....	1.02
" heavy.....	.65
Mid-continent, heavy.....	.28
Henrietta, Tex.....	.60

The color of the Tilbury oil in bulk is a dark olive green. This, however, as is frequently the case with liquids, changes when viewed in a thin layer. If a few drops of the oil be poured upon a piece of window glass and then allowed to spread out, the color appears to change to a pale yellow or amber. It runs from 38 to 41 Baumé standard.

The Romney oil is described by refiners as a "dead" oil. It contains a high percentage of sulphur. A small quantity of naphtha is extracted from it at the refinery, and the balance is sold as fuel. It is about 28 to 30 Baumé.



The John Cooper farm, East Tilbury, showing the flat topography of the region.

The Tilbury Field

From the map accompanying this report it will be seen that, though the oil and gas producing territory is spoken of as the "Tilbury field," the eastern part lies in the township of Raleigh. The lots which were producing oil or gas at the time of my visit, or those which were said to have produced oil at one time, are shown by light shaded lines. The gas wells are indicated by a black circle, while the dry holes are shown by a star. Time did not permit the obtaining of a complete list of dry holes. It was considered by Mr. Wilson McCright, of the Imperial Oil Company, that the field on the east, north and west is fairly well defined. The plan shows that the dry holes surround the oil territory on these three sides. If the Nelson farm (north part lot 12 in the fourteenth concession of East Tilbury) be regarded as the southern limit, the field would then have a length in a north and south direction of about eight and a half miles. There is, however, considerable untried territory between the Nelson farm and the producing farms farther north. The average width is about three miles.

The southern part of the field is regarded by operators as the gas territory, and the majority of the large gas wells are there. Two gas wells occur at the north end of the field, one on the north part of lot 1 in the sixth concession, the other on the south part of lot 1 in the fifth concession, of the township of Raleigh.

Some Leading Operators

Following are some of the largest operators: Volcanic Oil and Gas Company, Chatham, Ont.; Roth, Argue & Co., Chatham, Ont.; Leamington Oil Co., Detroit, Mich.; Congress Oil Co., Wellsville, N.Y.; E. C. Bradley "and others," Wellsville, N.Y.; F. S. Clark, Andover, N.Y.; The Empress Tilbury Oil and Gas Co., Chatham, Ont.; The Maple City Oil and Gas Co., Chatham, Ont.

It was not possible to visit every producing farm. Only a few of the properties are therefore mentioned in detail.

The Volcanic Oil and Gas Company was operating on the following lots:

The Stevenson farm, lot 3, concession X, East Tilbury

The John Holmes farm, north half lot 1, concession V, Raleigh.

The Halliday farm, north half lot 1, concession VI, Raleigh.

The Finn farm, south part lot 2, concession V, Raleigh

The Campbell farm, lot 4, concession IX, East Tilbury.

For June of 1907 this company produced 4,530 bbls. oil. The gas well, (which is supplying the city of Chatham) on the Halliday farm, lot 1, in the sixth concession of Raleigh, is also one of the best oil wells owned by the company; it was said to be making 500 bbls. of oil per week the first part of July. The company has also other gas wells in Tilbury.

The Empress Tilbury Oil and Gas Company is operating on lot 5 in the eighth concession of East Tilbury; the lot is known as the Mat. Campbell farm. This is said to be one of the best leases in the field. It contains 100 acres, and had six producing wells on July 15th. The monthly production for May and June was said to be about 2,000 bbls.

The Henry Cooper lease immediately to the north was also regarded as one of the best farms in Tilbury, and was said to be making 3,000 bbls. per month.

The Maple City Oil and Gas Company was operating the following lots:

The Irwin farm, lot 7, Middle road north.

The Robinson farm, southeast quarter lot 11, Middle road south.

The Burgess farm, east half lot 14, Middle road south.

There were nine producing wells. The monthly output was stated by the secretary of the company, Mr. J. W. Aitken, to be about 1,500 bbls. from the Irwin farm. The two wells on the Burgess and Robinson farms are gas wells, though the latter does produce a little oil.

The Nelson lease (north half lot 12, in the fourteenth concession) was the most southerly lot in the Tilbury field. The well was producing about 40 bbls. a day. A pipe line conveys the oil to Glenwood on the Pere Marquette railway about a mile to the northeast. A gas well supplying Merlin is also found on this lot. Some five new wells were being drilled in at the time of my visit.

Dry Holes

It was found impossible to learn the number and location of wells that had at one time been producing oil, and that had subsequently ceased to produce. But Mr. McCright of the Imperial Oil Company supplied the location of the following dry holes:

In Raleigh township: Lot 4, concession III, southwest corner; Vince farm, lot 3, concession V, centre of west half; Williams farm, lot 4, concession VI, the north part; Newham farm, lot 2, concession VII, centre west part; Kahlar farm, lot 1, concession VII, near township road; Lahey farm, lot 1, concession VIII, centre of lot, near township road; McKeon farm, lot 1, concession IX, northwest part; McKeon farm, lot 2, concession VIII, centre west part; Lecocq farm, lot 4, concession A, west part of lot; Orr farm, lot 9, concession III.

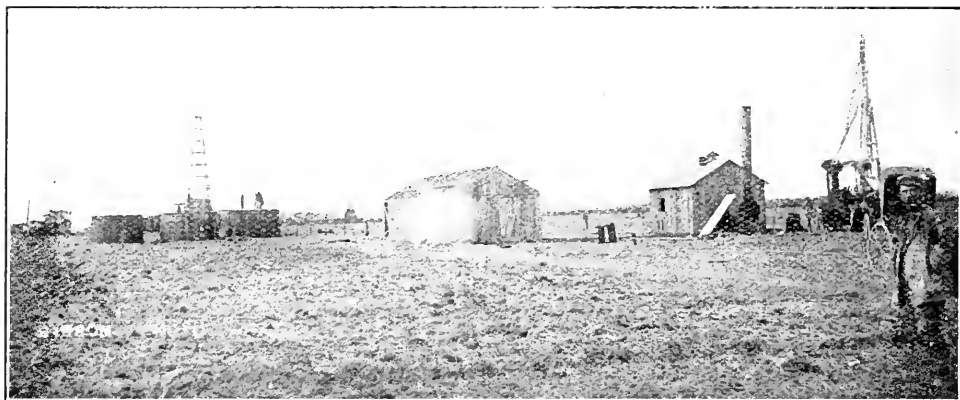
³ What is known as the "Middle road" cuts across the township of East Tilbury in an east and west direction. The lots on the north half are referred to as "Middle road north," those on the south as "Middle road south."

East Tilbury: Roman Catholic Church, lot 1, concession III, west part of lot; R. Purdy farm, lot 3, concession IV, southeast part; Reaume farm, lot 4, concession V, southeast corner; A. Simard, lot 3, concession VI, east part, (a well here did produce oil but the well has been abandoned and the casing withdrawn); Adam farm, lot 4, concession VII, west part, produced a little oil, but abandoned; Gracey farm, lot 4, concession VII, south part; J. D. Cooper farm, lot 5, concession VII, southeast part; Murphy farm, lot 7, concession VII, centre east part; Norry farm, a small triangular lot or gore, lot 11, concession VII; Ross farm, lot 10, concession VII, south part.

Gas in East Tilbury and Raleigh

There are several important gas wells in the territory which are of great service to the towns and villages taking advantage of the situation. The following is a list of these wells, supplied by Mr. Wilson McCright, of the Imperial Oil Company:

Burgess, lot 14, Middle road south, northeast corner, East Tilbury; J. Richardson, lot 14, Middle road north, southeast corner, East Tilbury; J. Sloan, lot 13, Middle road north, southwest corner, East Tilbury; W. Sloan, lot 12, Middle road north, southwest corner, East Tilbury; W. Graham, lot 12, Middle road south, north part, East Tilbury;



Oil tanks and derricks, East Tilbury field.

J. D. Grant, lot 12, concession XI, southeast part, East Tilbury; Nelson, lot 12, concession XIV, East Tilbury; J. J. Irwin, lot 8, concession XII, southwest corner, gave gas at first, when "shot" water came, East Tilbury; Joyce, lot 12, concession XII, southeast part, East Tilbury; Halliday, lot 1, concession VI, northwest part, Raleigh; Wm. Robinson, south half lot 11, Middle road south, East Tilbury; lot 1, concession V., southwest corner, Raleigh.

The city of Chatham has for the past two months, been supplied with natural gas. At the time of writing, the total supply was derived from one well, on the David Halliday farm in the northwest part of lot 1, in the sixth concession of Raleigh. The depth of this well is 1,421 feet, gas having been struck at 1,417 feet. It is lined with 3-inch tubing and packed with a Dresser packer, and was closed in on September 16th, 1906. The gas is at present conveyed to Chatham some 10 miles distant, in a 3-inch pipe on the surface of the ground, which is to be replaced later on by a 6-inch pipe. The rock pressure of the closed-in gas was, when first measured, 650 lbs. per square inch. It is said, however, to have decreased somewhat since then. At the time of my visit the pressure was said to be about 460 lbs. The gas is conveyed to the city limits under a pressure of 200 lbs., where it is reduced to 60 lbs. At the Chatham Gas Company's works, which is the distributing point, it is further reduced to 6 ounces, at which pressure it is delivered to the consumers.

On lot 14, Middle road north, East Tilbury, the company has another gas well giving 500,000 cubic feet per day. It is to be used to supply gas to Chatham consumers, and will act as an auxiliary. The company will, later on, have other wells for the same purpose.

Mr. P. S. Coate, manager of the Chatham company, has supplied the following figures regarding the price at which natural gas is sold in Chatham. It varies from a maximum of 35 cents per 1,000 cubic feet to the smallest consumer, down to 12 cents for the very largest consumers. The rate for lighting and cooking combined is 35 cents per 1,000. For heating it is 27 cents per 1,000 for the first 100,000 cubic feet; for the next 50,000 the price is reduced to 22 cents; for any quantity over 150,000, the rate is 17 cents. For manufacturers using gas engines for power, the minimum charge is \$37.50 per month in the expectation that the consumer will use not less than 250,000 feet per month, which is at the rate of 15 cents per 1,000. In the case of manufacturers using gas under boilers, the rate is 12 cents per 1,000 for any desired quantity.

That natural gas has been a boon to the citizens of Chatham can be seen from the fact that artificial gas was formerly sold for lighting and cooking purposes at \$2.50 per 1,000, with a discount of 30 per cent. off for cash within 10 days of rendering the account.

Nearly every farmer along the gas pipe line into Chatham now uses gas for lighting and cooking.

Professor E. B. Shuttleworth of Toronto gives the following as the composition of the gas:

	Per cent.
Hydrocarbons, principally methane.....	92.20
Carbon dioxide.....	1.40
Oxygen.....	trace
Carbon monoxide.....	.21
Hydrogen.....	.40
Nitrogen.....	5.59
Sulphuretted hydrogen.....	.20
Total.....	100

A comparison of this with the natural gases found in Ohio and Indiana shows that they closely resemble each other. Some objection was at first made to the use of Tilbury gas on the score that it contained sulphuretted hydrogen. The Chatham Gas Company are therefore preparing to purify the gas by the removal of this objectionable constituent.

The Burgess well, lot 14, Middle road south, East Tilbury, is also an important producer. It is owned by the Maple City Oil and Gas Company. Before being finally closed in the gas escaped for five months. On July the 18th the writer was present during a test made by D. Robertson and A. A. Crawford, Pittsburgh, Pa. The well was opened one hour and twenty minutes before the gauge was put on.

At the end of the first minute the pressure was	280 lbs. per square inch.
" " " second "	" " 400 "
" " " third "	" " 460 "
" " " fourth "	" " 495 "
" " " fifth "	" " 510 "

The gas flowed at the rate of 3,100,000 cubic feet per 24 hours. This well is supplying the villages of Tilbury and Merlin, and also the farmers along the pipe line. It is conveyed to Tilbury part of the way in a 2-inch pipe and the remaining distance in a 3-inch, under a pressure of 100 lbs. per square inch. At Tilbury it is distributed in 4-inch mains.

The Maple City Oil and Gas Company also own what is known as the William Robinson well, south half lot 11, Middle road south. The well produces some oil also. It was capped at the time of my visit for future use. On July 18th the well was tested

by the same gentlemen who tested the Burgess well. It was left open three-quarters of an hour before the gauge was put on.

At the end of the first minute the pressure was 160 lbs. per square inch.					
" " second "	"	220	"	"	"
" " third "	"	280	"	"	"
" " fourth "	"	300	"	"	"
" " fifth "	"	320	"	"	"

The gas flowed at the rate of 1,000,000 cubic feet per 24 hours.

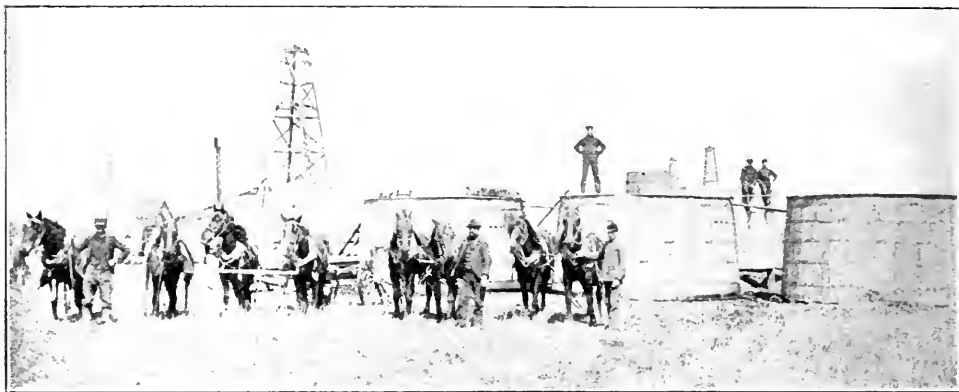
The gas well on the Nelson farm, north half lot 12, in the fourteenth concession, East Tilbury, has a 2-inch pipe line to the village of Merlin, some five miles east.

There is also another good well at the southwest corner of lot 1 in the fifth concession of Raleigh. It was being used for drilling purposes only.

Owing to the lack of time, the other wells given in the above list were not visited.

The Romney Field

This territory is sometimes referred to as the shallow pool. The oil is struck at less than 300 feet. It is a much smaller field than the Tilbury, and the relative importance up to date of the two fields may be seen by comparing the production in each case.



Oil tanks and derricks, Romney field.

From the accompanying plan it is seen to lie at the north part of the township of Romney, but a small part occurs in East Tilbury.

Forty-seven wells have been drilled, of which 24 were dry. There are no gas wells proper, though on lot 23 in the ninth concession, one well was said to be giving enough gas to run three gas engines if required. At the time of my visit the field was quiet compared with the March previous. Several causes have already been stated for this. The Hornick Farm Oil Company (lots 23 and 24, in the ninth concession of Tilbury) was said to be the largest oil producer about the middle of July. The daily production was given as 100 bbls. per day. Four wells were pumping.

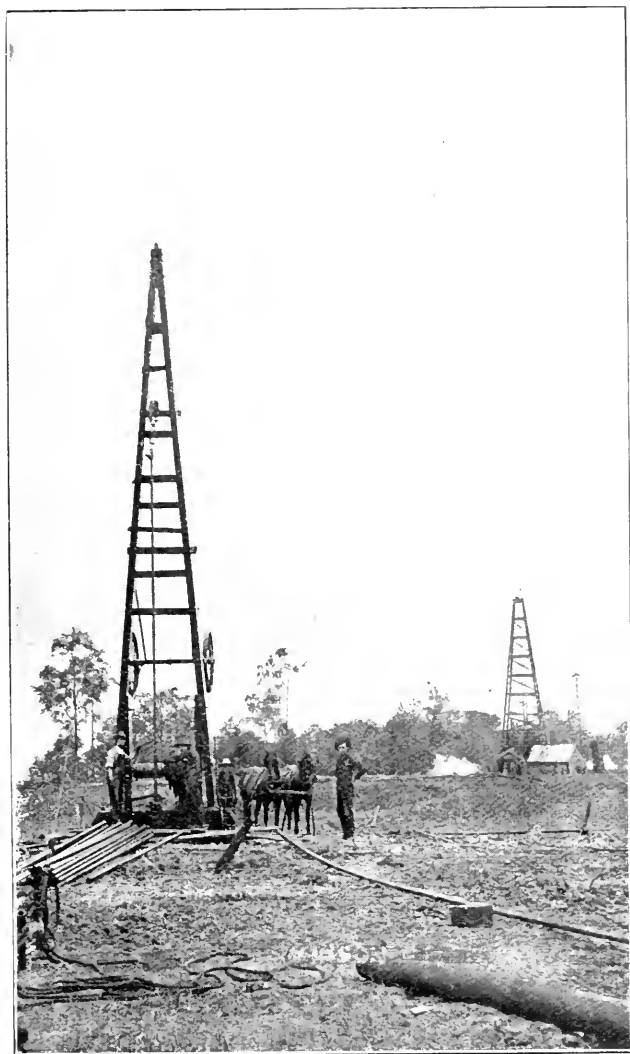
The oil is piped to Coatsworth station on the Pere Marquette railway, about two miles southeast.

Some of the principal operators are: Norton, Church, Bowlby and Benson, Chatham; Barnard-Argue-Roth-Stearns Oil and Gas Company; Hoverstate and Chase; Hornick Farm Oil Company, Tilbury, Ont.

Handling the Oil in Tilbury

Three stages occur in the collection of the oil. It is first piped from the different wells on a farm into one or two tanks. Thence it goes to a large central station for the whole field; the third step is its transference to the railway station tank at Merlin. Pipe lines have been installed carrying the oil from the wells to the central storage

tanks and pumping station. These latter are owned by the Imperial Oil Company of Sarnia, and are situated on lot 3, in the ninth concession of East Tilbury. The main tank is steel, with a capacity of 3,840 bbls. There are also other tanks, bringing the total capacity up to 6,000 bbls. Two pipe lines—one 4-inch and one 2-inch—convey the oil from here to Merlin, four and a half miles distant. It is pumped under a pressure varying from 200 to 400 lbs., and it is possible to send 3,500 bbls. in ten hours. At



Portable derrick (on left). This type is replacing the stationary derrick.

Merlin the receiving tank is built higher than the oil cars (which convey the oil by rail to the Imperial Oil Company's works at Sarnia) so that no pumping is necessary at this point in the transmission.

In order to understand the system of pumping the oil from the wells and piping it to the local tank on each farm (or for each group of wells) a description is given of the method on one lot. This holds good for the whole field.

The Irwin farm, lot 7, Middle road north, East Tilbury, is operated by the Maple City Oil Company, Chatham. There were nine producing wells on the farm. The power for pumping is a gas engine in which natural gas is used. This power plant is placed in a central position. Surface rods run to each well at which a pump is placed. The power plant is so constructed that the pumps are run by the surface rods simultaneously. The length of the rods will of course depend on the distance each well is from the power plant. The local tanks on each farm are generally 250 bbls. capacity.

Drilling the Wells

The drilling is generally done by contractors. In the Tilbury field the contractors get from 85 cents to \$1.00 per foot. Most of the wells are about 1,400 feet. Besides the \$1,400 paid the contractor, the owner must shoot the well with nitro-glycerine, at a cost varying from \$150 to \$200. Adding the expense of lining a well to the above the cost will run up to about \$3,000. If the well proves a "duster" (a dry hole) the casing is removed, and the operator probably loses about \$2,000.

About 150 bbls. of water per day are used by a contractor in drilling; this includes water for the boiler. The lack of fresh water was somewhat of a problem at the time of my visit. On the average it takes about 25 days to drill a well in Tilbury.

The number of wells sunk on a farm depends on its size and fertility. The general rule was to place them not nearer than 500 feet. They are, however, drilled much closer on adjacent lots owned by different companies.

Because the wells are shallow in the Romney pool, drilling costs considerably less than in Tilbury. The wells have been drilled closer together than in the latter field.

After a well has been drilled in and cased the newer practice with oil men is to use a portable derrick which will serve some 25 wells. It is used for making repairs to the wells. This form is replacing the old stationary derrick.

Contractors work day and night except Sundays. Only two men are engaged at each shift, that is from 12 noon until 12 o'clock midnight, and from 12 midnight until 12 noon. These two men run the engine, remove the drill and clean out the hole.

Notes on Geology

In driving from Chatham to the Tilbury oil field the surface of the ground is seen to be very flat and monotonous. It is, however, in the vicinity of Chatham slightly rolling, but these gentle undulations apparently disappear before the oil country is reached. The only marked relief to the flatness of the country is at the village of Blenheim on the Pere Marquette railway, some ten miles southeast of Chatham. Here the country rises gradually about 25 feet or more above the flat regions to the north. A pit at one point on the top reveals gravel. Going from Blenheim to Merlin by railway the hill is seen to disappear to the southwest. More boulders were noted in the vicinity of Blenheim than in the country further north. The long tangents of the railway are another evidence of the flat topography. This condition has made it necessary to build numerous drains, some of them several feet in depth and twenty feet wide, in order to carry on successful farming. The soil is largely clay with a few boulders in sight.

According to Eugene Coste⁴ the drift varies in thickness from 100 to 150 feet, "and is composed of boulder clay on the top and sands and gravels varying very much in thickness below. The first strata struck under this drift (in the Tilbury field) are the gray blue shales of the Hamilton or Middle Devonian formation, the so-called upper soapstone or soap of the Petrolia driller; then comes the middle lime and the lower soap of the same formation followed by the Corniferous or big lime of the Lower

⁴ Journal Can. Min. Inst. Vol. X.

Devonian, which is struck at depths ranging from 230 to 285 feet, and is about 150 feet thick. Below this are the dolomitic limestones with flint and gypsum of the Onondaga, or Upper Silurian, a little more than 1,000 feet thick; then come the Guelph and Niagara, Silurian dolomitic limestones in which, so far, the drilling of the wells has been stopped, but it is likely that in future in some parts of that field or not far from it, the wells will be drilled deeper still, and will obtain their gas and oil either from the Clinton limestone immediately underlying the Guelph and Niagara and about 150 feet thick in that section of the country, or from the still deeper strata of the Trenton limestone lying about 900 feet under the Clinton from which it is separated by the Medina, Hudson River and Utica soft shales, which can be drilled through very quickly and cheaply.

"The gas and the two upper oil pays in the southern part of the field are found in the lower brown dolomites and gypsum of the Onondaga, while the lower oil pay is struck in the upper beds of the Guelph and Niagara. In the north end of the field, north of the Michigan Central railway, the lower beds of the Onondaga are barren of oil, which is there altogether found in the Guelph, but the gas is still found there in the lower beds of the Onondaga in the strata which form the first and second oil pays of the south end of the field. In the middle part of the field on the other hand, the oil is struck in the Onondaga strata which constitute the gas pays in many of the wells of the middle western part of the field."

In the Romney pool, Mr. Coste goes on to say that "the oil is struck at the shallow depths of 200 to 270 feet, in the upper part of the Corniferous formation or Big Lime, the top of which is struck at 180 feet."

The following log of a well on the J. W. Campbell farm, East Tilbury, is quoted from Mr. Coste's paper.

Log of the Central Oil and Gas Company Well No. 1 on the J. W. Campbell farm (southeast corner of lot 6 in the IX concession of the township of Tilbury East, Kent county, Ont.) Elevation 600 feet, A.T.

Formation.	Description of strata.	Thickness feet.	Depth feet.	Remarks.
Drift.....	Boulder clay.....	95 to	95	
	Grey sand	5 to	100	A little gas.
	Clay and gravel	28 to	128	10 in. drive pipe to 138 ft.
Hamilton.....	Blue clay shale (upper soap).....	37 to	165	
	Middle lime.....	10 to	175	
	Blue clay shale (lower soap).....	67 to	242	
Corniferous or Big Lime	Yellow Limestone.....	158 to	400	8 in. casing to 243 ft. A show of oil at 250 ft. 6 1/4 in. casing to 835 ft.
Onondaga	Grey, drab, brown and blue dolomites with gypsum and flint (shaly series with darker shaly dolomites and more gypsum from 835 to 1,185).....	1,020 to	1,420	1,250 ft. 1,362 ft. Gas at 1,370 ft. 1,376 ft. 1,382 ft.
Guelph	Blue white dolomitic limestone.....	9 to	1,429	Oil at 1,392 to 1,400 ft. and at 1,416 ft. oil at 1,426 ft.

On the Mat. Campbell farm, East Tilbury, lot 5 in the eighth concession, oil was struck in five wells at the following depths: 1,390, 1,395, 1,398, 1,399, 1,405 feet respectively.

In the Romney pool a well on lot 23 in the ninth concession, East Tilbury, gave the following log: Drift to 148 feet; soapstone to 192 feet; oil at 250 to 270 feet in Big Lime.

Further south on the Trembley farm the drift is 145 feet, and gas was struck at 176 to 283 feet.

In shooting a well fragments of the oil-bearing rock an inch or so in diameter may be blown up the drill hole. One of these from the Mat. Campbell farm, lot 5 in the

eighth concession, East Tilbury, has a dull grey color. It effervesces fairly freely with hydrochloric acid. The oil pores vary in size from microscopic cavities to one-quarter of an inch in diameter. They are more abundant in some spots than in others. For instance a surface containing half a square inch will sometimes show comparatively few visible pores, while on another surface they are more numerous.

The Kipp Field

About two miles southeast of Chatham there is in Raleigh township, a small shallow oil pool, the position of which may be seen by consulting the accompanying map. There are two companies operating here: The Kipp Oil Company, Chatham, and The South Western Oil and Gas Lands, Limited, Petrolia. The oil is struck at 360 to 400 feet.

The Kipp Oil Company is operating on lot 25 in the eighth concession of Raleigh, and lots 23 and 24 adjacent to the northwest. Nine wells are pumping, and the output was said to be 150 bbls. per month. The Imperial Oil Company at Sarnia has received 259 bbls. from this company for the first six months of this year. The wells give sufficient gas to run the power plant. The company is said to have been producing oil continuously for the last four years.

The South Western Oil and Gas Lands, Limited, is operating on lots 23 and 24 in the eighth concession, Raleigh. Eight wells were pumping at the time of my visit. No oil has as yet been shipped.

Mr. W. MacIntosh, secretary of the company, has given the following log of well No. 14 on the property: Drift to 110 feet soap to 185 feet; middle lime to 190 feet; lower soap to 236 feet; oil at 360 feet in Corniferous lime.

I. - IRON RANGES EAST OF LAKE NIPIGON

By A P COLEMAN

Introductory

In accordance with the instructions of Mr. T. W. Gibson, Deputy Minister of Mines, work was carried on during the summer of 1906 on the east shore of lake Nipigon in the neighborhood of Poplar Lodge and Sturgeon river. Mr. T. L. Goldie was appointed my assistant during the earlier part of the work, and took in hand the topographical side of the survey, rendering very useful service in this capacity. During July I was called off to join an "International Committee on the Correlation of the Pre Cambrian Rocks" of Eastern Ontario and New York, and so had to leave the Nipigon field. Mr. E. S. Moore then took charge of the work as geologist, Mr. Goldie continuing to act as topographer. Their field work was devoted to the extension of the Sturgeon river iron ranges eastward beyond a band of eruptive rock which cuts them off about 17 miles inland from Poplar Lodge.

The iron ranges east of lake Nipigon have been more or less known for a number of years, and several geologists have touched the region. Mr. Peter McKellar having surveyed the shore many years ago as assistant to Dr. Bell,¹ and more detailed work on lake Nipigon and its islands having been done at a later time by Mr. Dowling.² The most important work, however, so far as our immediate area is concerned, was that of Prof. Parks in 1901:³ and I am much indebted to Mr. A. P. Low, Director of the Geological Survey of Canada, for his kindness in supplying a tracing of Dr. Parks' forthcoming map of the region. Part of the southern range was visited by Mr. J. W. Bain for the Bureau of Mines in 1900, and a brief account of his work appears in the report of the following year.⁴ None of these geologists made any attempt at mapping the Iron formation, however.

Within the last few years many claims have been staked and surveyed on these ranges and a certain amount of stripping and diamond drilling has been done to open them up, Mr. Flaherty and the Lake Superior Power Company having been most active in the development. I am under much obligation to Mr. P. A. Leitch, Mr. R. H. Flaherty, and Prof. A. B. Willmott for numerous tracings and blue prints giving the results of their exploration. Thanks are due to Mr. Leitch also for aiding us in securing canoemen and guides for the work.

We were fortunate enough to have the services as guides of H. J. Scott and Michael Ralph, who originally located many of the claims, so that nothing known to them in the way of outcrops of iron range was overlooked.

Owing to the great demand for canoemen and guides for parties locating the line of the Grand Trunk Pacific railway north of lake Nipigon, Indian helpers were very scarce, and wages abnormally high.

Geographical Relationships

Lake Nipigon is 852 feet above sea level, according to White's "Altitudes in Canada," so that in reaching it there is an ascent of 250 feet, implying numerous rapids and falls on Nipigon river on its course from the lake to Nipigon bay of lake Superior. As the river is famous for its brook trout the route is much frequented by fishing parties, and during the last two years it has also been much travelled by expeditions connected with the survey of the Grand Trunk Pacific railway. On this account the portages are

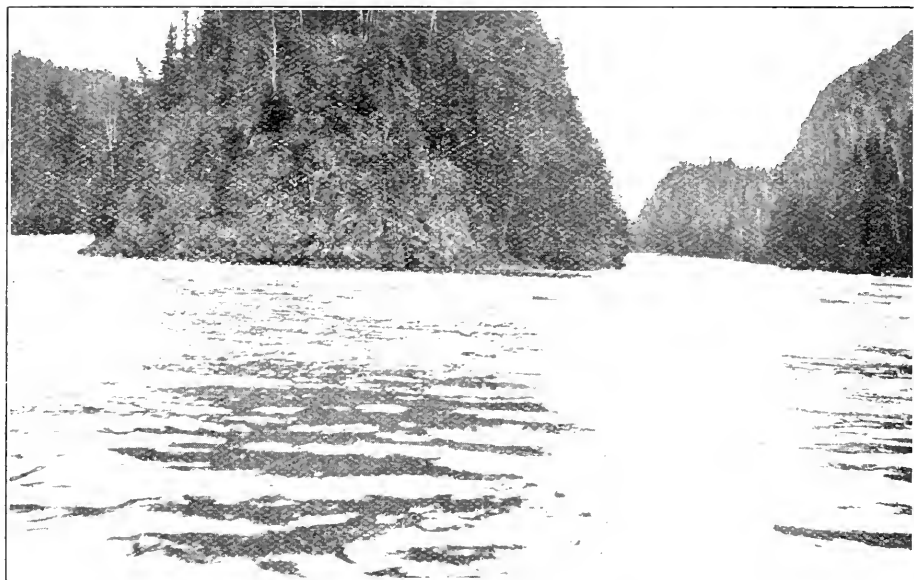
¹Geol. Sur. Can., 1866-69.

²Ibid., 1893.

³Sum. Rep. G. S. C., 1902, pp. 211-20.

⁴Bur. Mines, 1901, pp. 212-4.

well beaten, and on two of the longest teams are kept for the transport of supplies, etc., past the rapids. On lake Nipigon itself two steamers were built during the winter of 1905-6, one by Mr. Flaherty, the other by Revillon Freres, a rival to the Hudson Bay Co., so that transport on the lake can be easily arranged.



Split Rock Rapids, Nipigon river.



Split Rock Rapids, looking south.

There are three depots or posts on the lake, one at South bay, another on the west shore, and the third at Obabicon bay on the northeast side. Poplar Lodge, on the east shore, was once a Hudson Bay post, but is now practically abandoned, the few supplies remaining in the log houses of the post being left in the charge of an Indian.

Route to Poplar Lodge

The canoe route to lake Nipigon begins at lake Helen, an expansion of Nipigon river just east of Nipigon station on the Canadian Pacific railway, and follows up the river to the Long portage of $2\frac{1}{2}$ miles, across gravel terraces and a moraine. Plans have been made to develop water power here by turning the river into a depression suggesting an old channel.

About 8 miles of paddling bring one to Split Rock rapids, where a bold island of rock parts the river into two foamy channels. For a mile below this the river flows through a wild gorge or canyon with steep walls of vertically jointed diabase. Then come Island portage, which is short, over gneiss, and Pine portage, about a mile and a half long.

Near Victoria camp we turned west up a tributary creek to lake Hannah. From this a portage of about three-quarters of a mile across flat sheets of diabase brings one to the shore of South bay on lake Nipigon. The landing here is over steep rocks exposed to a heavy sea in westerly winds, so that it is sometimes dangerous to launch canoes.

About five miles south is South bay post, in a narrow-mouthed, well sheltered harbor to which supplies are teamed in winter. It was in this harbor the two small steamers mentioned before were built.

The route round the promontory toward the outlet of lake Nipigon is somewhat risky for canoes, owing to the wide reach of water, but near the southeast corner of the lake the Virgin islands give some protection. Beyond them open water extends as far as the eye can see toward the north, and canoes generally coast carefully along to Poplar Lodge, near the mouth of Sand creek.

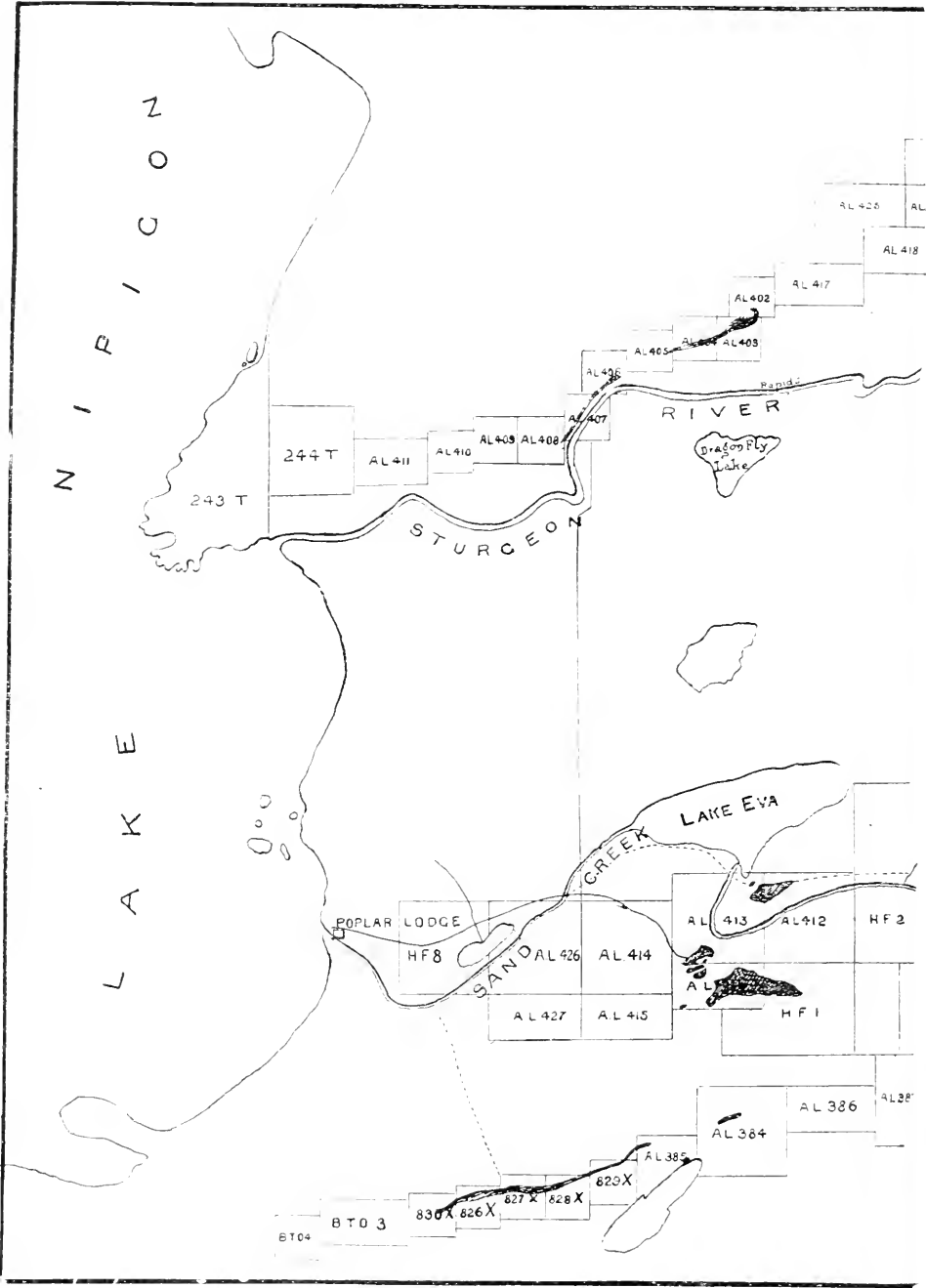
There are several log houses at Poplar Lodge in addition to the two belonging to the Hudson Bay Co., winter quarters for a small band of Indians, who scatter in summer, leaving the place deserted.

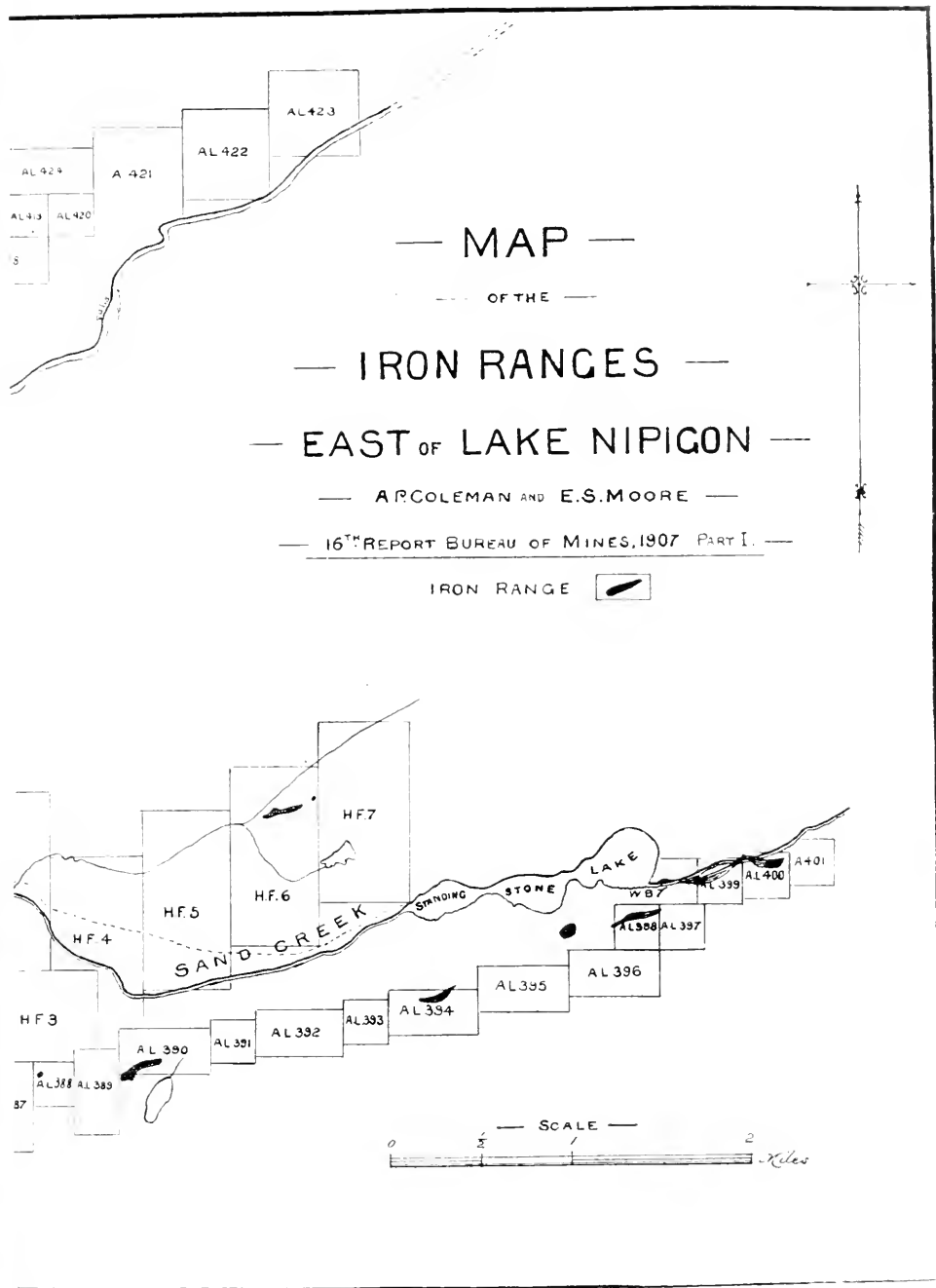
Years ago the Hudson Bay post was about a mile up Sturgeon river, which enters lake Nipigon about two miles above Poplar Lodge, but the only trace now left of it is the hollows of the cellars under the houses. There are two camps in the region, provided with good log houses for the use of men employed two or three years ago in stripping and drilling on the iron ranges, one of them about two miles east of Poplar Lodge, the other about two and a half miles up Sturgeon river. Both are now deserted. Travel in the region east of the lake may be undertaken in canoes on Sturgeon river, and a chain of lakes beyond, or by roads and trails cut out for exploring purposes east and south of Poplar Lodge.

Topographical Features

The region cut by Nipigon river is in general rugged and even mountainous, especially in the neighborhood of Split Rock, where the canyon walls are wild and imposing. Most of the hills are flat-topped by reason of the nearly horizontal sheets of diabase with which they are capped. The southeast shores of lake Nipigon partake of the same character, showing often steep cliffs and flat-topped ranges of hills with deeply cut valleys between. These features are characteristic of the Animikie region, with its massive sills of diabase.

Farther north, near Poplar Lodge, older rocks having much less regularity, give a more varied topography, with a general east and west strike of the hills and ridges, corresponding to the strike of the rocks and their schistosity. Here the valleys are sometimes wide and flat-bottomed, and swamps and sand and gravel beds hide the bed rock.





Hydrography

Lake Nipigon may be looked on as the first of the chain of Great Lakes, though it differs greatly from the others of the chain in the vast number of large and small islands which rise from its clear deep waters. In this respect it may be compared to Georgian bay, though the islands are largely flat-topped hills of diabase, unlike the rounded Laurentian islands of the latter body of water.

It is about 65 miles long, by 44 miles wide, and but for its islands would be a very impressive body of water, suggesting lake Superior by its clearness, depth and the boldness of its shores.

The Nipigon river is probably the largest affluent of lake Superior, carrying off the waters collected in the lake by dozens of small and large streams, some of them very respectable rivers. In the district studied, Sturgeon river is the largest, having a width of 50 to 100 yards in the lower part of its course, where its current is not rapid. About five miles up there are falls, and above this numerous falls and rapids. South of



East shore of Lake Nipigon ; sill of diabase.

Sturgeon river there are several small lakes, drained mainly by Sand creek, which enters lake Nipigon at Poplar Lodge, and is navigable by canoes for only about a mile. The rivers have brown water, unlike the crystal clear water of the lake into which they flow.

Surveys

The region has not been surveyed into townships, and, consisting as it does in the main, of rocky ridges, muskegs and sand plains, it cannot be looked on as of value for agricultural purposes. The oldest surveys carried out were either for the location of the old Hudson Bay post, near the mouth of Sturgeon river, or of two mineral claims near it. Later a large number of iron claims were blocked out by compass lines, and afterwards surveyed into locations of various sizes. The lines enclosing the locations are easily followed, since they were cut only a few years ago and no fires have run to destroy them, but some on the southern range were cut in the winter when the snow was deep, so that the stumps are eight or ten feet high, and the trees chopped at this level

make a very difficult slash to work one's way through. In mapping the formations the lines were paced and points determined from the nearest corner post.

Except for some fairly good spruce, not much timber of value is to be seen in the area mapped, which belongs to the Nipigon Forest Reserve, looked after by a small force of rangers. The beauty of the scenery and the excellence of the trout fishing no doubt justify the reservation, which can never be of value for farming purposes. The lake itself supplies excellent whitefish and salmon trout, which are caught by the Indians in nets; and sturgeon are numerous in the river bearing that name, and are taken by the Indians at the usual season.



Surveyor's post east of Poplar Lodge.

Classification of the Rocks

The rocks of the region mapped include a number of types divided between the Lower Huronian and the Keewatin. The only undoubted Lower Huronian rocks are coarse conglomerate, sometimes schistose; but probably some slaty and arkose rocks found near the conglomerate are also of this age. The Keewatin includes the Iron formation, of banded quartzite and magnetite, or jasper and hematite, and some slate; various schists and arkoses, chloritic, hornblendic, sideritic, dolomitic; and basic erup-

tives, now so weathered that they can only be called greenstones, but originally, at least in part, lava flows, since pillow and amygdaloidal structures occur.

There are also some gabbro and quartz diorite areas of uncertain age, some of them later than the Iron formation, and probably later than the Lower Huronian conglomerate. The rocks of the region may be tabulated as follows:—

ARCHÆAN	{	Later Eruptives--gabbro, diabase, etc.
		Lower Huronian--conglomerate and probably slate and arkose.
	Keewatin {	Iron Formation. Green and gray schists, sometimes sideritic. Greenstones and volcanics.

The Lower Huronian Conglomerate

Conglomerate, classed as Lower Huronian, is rather frequently found in the Poplar Lodge region, generally not far from the Iron formation; but no large areas are known. Occasionally this rock, somewhat metamorphosed, stands up as sharp hills or short ridges, but often it is in narrow bands parallel to the Iron formation and not rising above the general level.

The most striking outcrop is a quarter of a mile north of the first rapid on Sturgeon river, where the rock forms a narrow, very steep ridge rising about 200 feet above its immediate surroundings and 550 feet above the river. It has a length of only about 600 feet and then drops down to a drift-covered surface, but small outcrops are found in the lower ground to the west. The rocks enclosed as pebbles and boulders include granite, aplite, diorite, felsite, various greenstones and green schists, white quartz, black silicious iron ore and a little jasper. The pebbles are mostly well rounded, but some are subangular. The matrix is a somewhat re-crystallized arkose, with angular fragments of quartz and feldspar, and little schistose structure, though the cleavage has a general trend of east and west, parallel to the direction of the ridge.

A much larger area of quite similar conglomerate forms part of a small range of hills about a mile to the northeast, crossing the boundaries of A L 418, 419, and 420. Here, however, drift somewhat obscures the outcrops, and much of the surface is covered with moss.

To the south of each of these hills there is gray slate or slaty gray schist, dipping nearly vertically or to the north, with a general strike of about 80°, corresponding to the usual direction in the region. Whether the slate overlies the conglomerate or underlies it is uncertain. The rock to the north of the conglomerate is greenstone with green schist.

On the central range conglomerate has been found as narrow bands in A L 414 and H F 5, the first being the most interesting. The road from Poplar Lodge to the camp on A L 413 crosses a small outcrop of well-preserved conglomerate containing pebbles of various rocks, and going south two other bands are crossed with green schist and Iron formation between, suggesting repetition by close folding. The best outcrop of conglomerate stands nearly vertical with a band of Iron formation to the north. It is about 20 feet wide and was followed for over 100 yards, each end dipping under swamp or drift. In character this conglomerate is very much like that of the northern range, but is much less extensive.

The conglomerate observed in H F 5 is narrow also, and seems to fade into gray green schist which lies to the north. A band of Iron formation runs parallel to it a little to the south, schist occupying the intervening space.

Conglomerate has been found only in one small outcrop along the southern iron range. But for the large amount of swamp and old lake deposits, it is probable that at least two bands of conglomerate could be traced across country, connecting up the

outcrops mentioned above; but on the whole, this rock is present in much less quantity than the schist conglomerate near the Michipicoten iron range on lake Superior. No evidence has been found to prove a glacial origin for the Nipigon conglomerates, though nothing was observed that conflicts with that hypothesis, which has been used by the present writer to account for a Lower Huronian conglomerate which is probably of the same age in the Cobalt silver region.⁵

The slate found beside the conglomerate in the northern range is dark gray, and with a well developed cleavage parallel to the schistose structure of the country. It appears to have been originally a muddy sediment; while the arkose, part of which may belong to the Lower Huronian, would represent sandy deposits.

As the Lower Huronian conglomerate is the next rock above the Iron formation, it is of importance as a guide to the structural relationships, especially in the working out of synclinal basins in which ore deposits might be found. On this account special attention was devoted to it.



Camp, Poplar Lodge.

Rocks of the Keewatin

The Iron Formation

At or near the top of the Keewatin occurs the most interesting rock of the region east of lake Nipigon, the Iron formation, including two rather distinct types, one banded gray and black with silica and magnetite, the other banded red and bluish gray or black, consisting of jasper and hematite. The former variety sometimes passes into the latter, a few dull bands of jasper occurring with the magnetite and gray silica. The black variety with magnetite is found on the northern and southern ranges, and the jaspery variety in the central range; and the three ranges seem to be quite separate but run parallel to one another. Just why the ore should be different in ranges less than a mile apart, associated with very similar rocks, is not quite clear, but even the small jaspery parts of the northern and southern ranges are easily distinguished from the brightly colored banded material of the central range.

⁵Am. Jour. Sc., Vol. XXIII, 1907, pp. 187-192.

The dark variety of Iron formation is often interbanded with dark slate having a similar appearance on outcrops, and there is every gradation between slate with no magnetic attraction and heavy magnetite.

The Iron formation of all three ranges is very commonly crumpled and folded on a small scale, though the general arrangement of the banding maintains a fairly uniform direction, a little north of east, and in most cases the bands dip at steep angles, or are vertical. Often the formation has been shattered, and the fissures filled by later white quartz, giving a very vivid, striking appearance to the rock.

In a general way the Iron formation of this region is more like that northwest of lake Superior, between Fort William and Hunters island, or on the Vermilion range in Minnesota, than that of the Michipicoten region. None of the soft sandy variety of Iron formation found near Helen mine was observed near lake Nipigon; nor is siderite present in appreciable quantity. A marked difference is observed in the absence of pyrites from this range, while in the Michipicoten region it is abundant.

Other Keewatin Rocks

Gray and green schists are always associated with the banded silica and jasper of the Iron formation, often lying interbedded with it or serving as a kind of matrix in which strips or crumpled masses of the Iron formation are enclosed. Usually the strike and dip of the two rocks are about the same. The green schist, consisting mainly of chlorite and hornblende, represents perhaps a basic volcanic ash, while the gray variety of schist contains some siderite and also sometimes quartz grains, like the Wawa tuff in the Michipicoten region, suggesting a sheared and altered quartz porphyry or rhyolitic ash rock, or perhaps arkose.

The green schist frequently seems to pass into greenstone with little or no schistose structure, like the Gros Cap greenstone of Michipicoten. Frequently this rock is filled with small white spots representing amygdulæ, as along the coast north of Poplar Lodge, and occasionally there is pillow structure indicating lava flows. At a few points this rock becomes coarsely brecciated with large and small angular fragments of at least four kinds of rocks, greenstones of different sorts, but no granite. The rock is probably a volcanic breccia or an agglomerate.

Evidently the region was one of great volcanic activity, with surface lava flows and explosive eruptions in Keewatin times. In general the schists and eruptives just described are characteristic of the Keewatin of northern and western Ontario, and occur in almost all the areas which have been studied in detail.

Slaty rock occurs with the schists in small amounts, and occasionally also arkose, green or rusty with small angular fragments of quartz and greatly weathered feldspar; and these rocks may represent ordinary sediments; but the distinctly eruptive materials mentioned above form the prevalent rocks.

Some of the darker slate is charged with magnetite grains and passes into the banded iron ore, so that it is often hard to fix the precise grade of the formation.

Later Eruptive Rocks

Rocks probably later in age than the Lower Huronian, and certainly later than the Keewatin, occur in large and small areas in the region, especially north of the northern range and west of the southern range. These rocks occur rather as bosses or batholiths than as dikes, and generally show a granitoid structure with no hint of surface conditions.

They vary considerably in character, but are often so mixed together that in our work, which was devoted chiefly to the iron-bearing rocks, it seemed inadvisable to map them in detail. They include pale greenish gray granitic looking rocks with much quartz, found in thin sections to be quartz diorite; a paler yellowish gray rock with the

feldspar greatly weathered, probably grano-diorite; and a dark green porphyrite with white plagioclase crystals.

Still later in age are some areas of fairly fresh gabbro or diabase, cutting off the southern iron range toward the southwest. It is possible that the last rocks are remnants of larger areas of diabase belonging to the Keeweenawan, but they may be merely the channels through which the material for the sills in the Animikie blocking the south end of lake Nipigon rose from the depths. They show no sill-like character in the region studied, but it is not improbable that Animikie sedimentary rocks with the usual Logan sills of olivine diabase once covered the Lower Huronian and Keewatin area, and have since been completely removed, leaving only the diabase of the necks through which the magma of the sills ascended.

Diabase of the same character is very wide spread in northern Ontario, occurring from the Cobalt region on the east to points beyond Fort William, always as dikes, rather small bosses, or sheets intercalated in sedimentary series. It is probable that all are of Keeweenawan age, but represent lavas which cooled below the surface, while the Keeweenawan amygdaloids were the corresponding surface lava flows.

The Northern Iron Range

The Northern iron range has been traced for about a mile in a general northeasterly direction on the north side of Sturgeon river, sometimes cropping out immediately beside the river, but generally separated from it by sand and gravel terraces. Locations have been surveyed, however, for long distances to the southwest and northeast, with the idea that extensions of the range would be included in them beneath the old lake deposits; so that the row of locations in about six miles long. To the west of the properties taken up for iron are two old locations, 243 T and 244 T, which it is said, were surveyed on account of deposits of copper.

As the Iron formation was the chief object of our work, its outcrops will be described first in some detail, while the locations in which none was found will be taken up more briefly.

A L 408 to 404

Going northeast along the line of locations the Iron formation is first met at the western boundary of A L 408, where it rises out of a gravel plain 65 paces north of the southwest corner post of A L 407, the next location to the northeast. Here the banded silica and magnetite are narrow so far as exposed, but may continue beneath the gravel plain. The Iron formation stands nearly vertical against the foot of a steep cliff of greenstone, which runs as a precipitous ridge northeastwards through A L 407. In places the banded silica seems to dip under the greenstone cliff, and as one advances along a rough trail cut out so as to follow its outcrop, it widens to about 30 feet.

This relation of high and rugged hills of greenstone or gabbro to the northwest and Iron formation resting against the steep southeastern flank, while old lake deposits hide the foot of the cliff, continues through the southeastern end of A L 406. Near the northwest corner of this location the highest hill along the range rises to 1,117 feet above the sea, or 265 feet above the river and lake Nipigon.

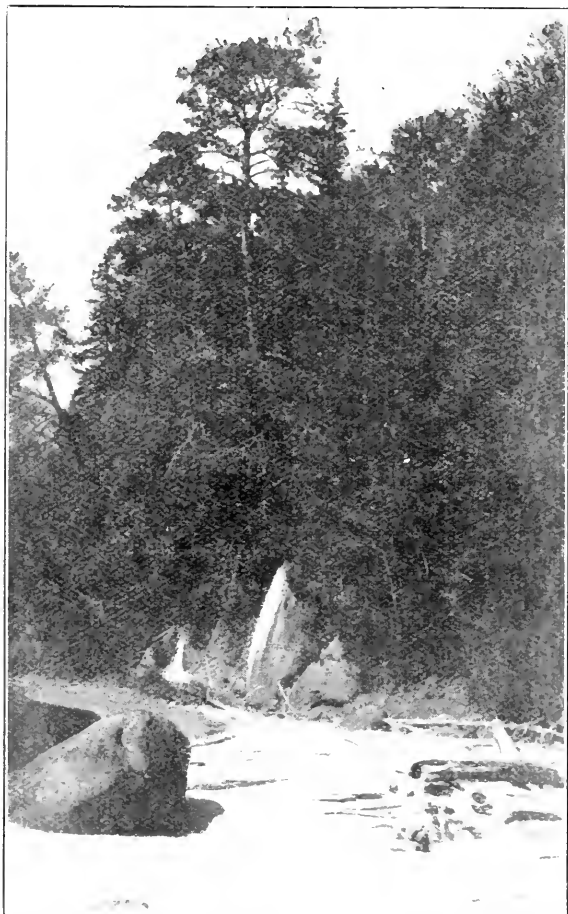
In A L 406 near the river bank some stripping has been done, showing about 30 feet of banded Iron formation running down to the water's edge, and a little to the east a diamond drill hole has been sunk, but I have no information as to the results. The silica here is partly in the form of jasper, and a finely banded rock with red, gray, green and white layers replaces the usual white or gray and black. At this point the strike is nearly north and south and the dip 35° or 40° to the west, showing a rather sharp bend from the usual northeast and southwest direction.

In A L 405 the Iron formation is almost entirely hidden by drift, and only shows on the eastern edge, at a point 90 paces north of the southwest corner of the next

claim, A L 404. Very little of the range is exposed on the western half of this location, but a considerable amount is found on the eastern side. At a small waterfall it has a dip of 35° to the northwest, beneath the greenstone which rises to the north. Near the boundary of A L 403 the banded formation widens out and includes a little bright red jasper, the dip being 45° to the northwest, under greenstone which no longer rises much above the general level.

A L 403

A L 403 the broadest outcrops of the Iron formation on the Northern range occur, about the middle of the northern side of the location, the width being 80 paces, though



Near mouth of Sturgeon river.

some greenish slate is mixed with the banded silica and iron ore. Most of the ore looks black and affects the compass, but when pounded shows a reddish powder, indicating a mixture of magnetite and hematite. The banded rock strikes a little east of north, and has a dip of 45° to 80° to the north, with greenstone and green schist beyond. In one section, about 150 paces west of the east side of the location a band of conglomerate occurs, so placed as to suggest a synclinal fold with Iron formation on each side and conglomerate in the middle, but moss and drift cover much of the section, and Iron formation was not found to the north, so that the relationships are not very certain.

For about a quarter of a mile south the surface is covered with old lake deposits, but on the shore of Sturgeon river fine grained greenstone crops out forming the rapids at that point.

Passing into A L 402 from the northeast corner of A L 403 the band of Iron formation changes its direction to northeast, with a dip of 45° to 60° northwest, greenstone and green schist rising above it. Beyond this the banded silica was lost under drift. Lower Huronian conglomerate is found a little to the east rising as the short steep ridge described on a former page.

In A L 417, the next location to the northeast, no banded rock was found, but some very rusty bands in green schist rising near the northwest corner are possibly a continuation of the range. To the north is the usual hill of greenstone; while to the south and east only drift plains were found. In A L 425 and the northwestern part of A L 418 the only rocks observed are greenstone and green, or rarely gray, schist, having a strike of 75° or 80° and a nearly vertical dip. At the northeastern corner of A L 418 and the southern parts of A L 419 and 420 a large hill of conglomerate occurs, mentioned before under the head of the Lower Huronian. Half a mile southeast of the conglomerate hill on A L 418, 419 and 420, at the falls, there is green schist, striking about 60° and dipping 45° to the northwest. Greenstone rises above the falls.

The only rocks observed on the other locations to the northeast are greenstone and green schist; but A L 422 and A L 423 are almost completely covered with sand plains and swamp. Whether the Iron formation extends out through them is quite conjectural.

Southwestward from the end of the range in A L 408 the conditions are similar, drift of various kinds covering the southeast sides of the locations and hills of greenstone rising toward the northwest; but in the greenstone paler and coarser grained eruptives occur; much better preserved than the bulk of the rock, perhaps because later in age. Examples of these coarser eruptives were found in several locations, and a very acid type with much quartz occurs a quarter of a mile north of the northwest corner of A L 408 and of A L 409. No evidence of the iron range was found, though the rocks rising as hills to the northwest of the drift plain are very like those under which the Iron formation dips in the locations described before from the centre of the range.

244 T and 243 T

Two large locations taken up so many years ago that the blazes on the lines are now very hard to follow, 244 T and 243 T, were briefly examined, without finding the Iron formation or any other deposit of importance; though it is said that they were taken up for copper. A very little iron and copper pyrites was found disseminated in a mass of diorite, but nothing that could be called an ore body. The only rocks observed were fine grained greenstone, irregularly mixed with coarser diorite, and a curious breccia, probably of volcanic origin, showing on the lake shore to the north and along the northern side of the mouth of Sturgeon river. It is probable that this rock is really much more extensive in its distribution, but it is hard to recognize except on wave cleaned shores, and might easily be overlooked on mossy surfaces inland. The best exposure is along the shore from the mouth of the Sturgeon river to the northward bend of the promontory beyond the bay.

At least four kinds of rocks occur as fragments in the breccia, a whitish green felsite, a dark very fine grained greenstone, a fine grained rock speckled with white and green, and green schist, all apparently eruptive in origin, and of angular forms not at all waterworn. The matrix consists of smaller angular fragments of the same materials. It is possible that the rock is a boulder clay, since the fragments are of all sizes up to two or three feet in diameter; but usually the boulders from till have their corners rounded, leaving them subangular. No pebbles or boulders of granite or the Iron formation were noticed. On the whole the breccia is more probably volcanic than glacial in origin.

A dike of felsite or quartz porphyry in a badly weathered condition cuts the greenstone north of the old Hudson Bay post near the mouth of the river, the only example of the kind found in the region. It has a width of ten feet and runs about 60° , the usual direction of the strike of all the rocks showing any marked cleavage.

Rocks between Northern and Central Ranges

The Northern iron range with its associated schists, greenstones and conglomerate lies entirely north of Sturgeon river, and no rock shows to the south, except small outcrops of green schist and basic eruptive at the first rapids, south of A L 403, and the falls, south of A L 420. Southeast of the river there is a band of drift materials, chiefly lake terraces of sand and silt, extending for half a mile or a mile, with no outcrops of solid rock. Beyond this to the southeast there is a band of greenstone and green



Mouth of Sturgeon river, Lake Nipigon.

schist averaging a mile wide before the Central iron range is reached. This barren region was crossed twice on lines running south from the rapids and from a bend of the river near A L 407. The last line was cut out some years before, apparently as a tie line to connect the two series of location surveys. These two lines and the section exposed along the shore of the bay between the mouth of Sturgeon river and Poplar Lodge have provided the information embodied in the map.⁶

Going south from the mouth of the river for the first mile only sandy shore with low cliffs of sand and silt are encountered; then the shore becomes rocky and greatly indented with tiny bays and inlets, while rocky islands give good exposures of similar rocks.

⁶ As Dr. Coleman is to continue the exploration of the Nipigon iron ranges during the season of 1907, it has been thought advisable to postpone publication of the geological map until the work has been more nearly completed.
—T. W. G.

In the southern part of this section different phases of greenstone are found, some showing little structure, others with pillow forms, and a small amount of amygdaloids, evidently ancient lava. Along with these massive varieties there are breccias like those described from the mouth of the Sturgeon river.

On the line run from A L 407 rock is not well exposed, though ridges rise through the muskegs and sand plains toward the south. The rocks observed are all green schist and carbonate schist, having the usual strike and a nearly vertical dip.

On a compass line run south of the first rapids on Sturgeon river, similar conditions were encountered, two little lakes interrupting the line across the sand plains. In the southern part much more rock is displayed, beginning as gray green schist having a strike of 60° and vertical dip, a little south of Dragon-fly lake, as we named the first body of water. Then comes swamp and a greenstone hill, followed by vertical green schist striking 50°. Around the second lake the rocks are greenstone and green schist, also; but a schistose carbonate comes in later, and then greenstone with small scattered amygdules reaching to the north shore of lake Eva.

The schistose rocks extend round the east end of lake Eva to the point where Sand creek enters it; and rise as hills also near the outlet of the lake, but much of the area to the south is swampy or drift-covered, except for low outcrops near the central iron range. East of lake Eva so far as known green schist is prevalent with comparatively small areas covered with old lake deposits, and this continues along the north shore of Standing Stone lake; but how far it extends to the north was not determined.

Still farther to the east a wide band of diabase, probably Keweenawan, separates the Keewatin containing the iron ranges near the shore of lake Nipigon from that near Windegokon lake. Lack of time prevented us from running lines to fix the boundaries of the diabase, which lies away from canoe routes or trails of any description.

No bands of the Iron formation reach so far east as the diabase and Mr. Moore has found that they run out in the green schist on the Wendigokan side also; so that the diabase cannot be said to cut across the iron ranges.

The Central Iron Range

The Central iron range is first seen on location A L 414, about three miles inland from Poplar Lodge by the road cut out to take in a diamond drill, sand plains covering the solid rock before this. Soon after the road crosses the northern boundary of the location a little banded hematite with red jasper is seen, with conglomerate to the southeast. South of this lean slaty ore occurs as a thin band, followed by lean hematite with silica, the whole striking 70° to 75° with a nearly vertical dip. A few paces south there is another band of lean slaty ore about ten feet wide with a parallel band of conglomerate 20 feet wide beside it, and another still thinner strip of lean ore to the south. The banded silica can be followed for 200 paces from its first outcrop above a swamp to its northeast end, where it is cut off by an irregular dike of gabbro. The strips of Iron formation just mentioned are valueless as ore, but interesting as illustrating a synclinal arrangement on a small scale with the overlying conglomerate nipped in between.

A hundred paces to the southeast near the dike of gabbro mentioned before banded silica and hematite crops out once more, evidently bent out of its course and cut in two by the eruptive. Some of the hematite shown by a stripping close to the gabbro is heavy, black and lustrous, evidently an excellent hard ore, but occurring only in bands a few inches or a foot thick.

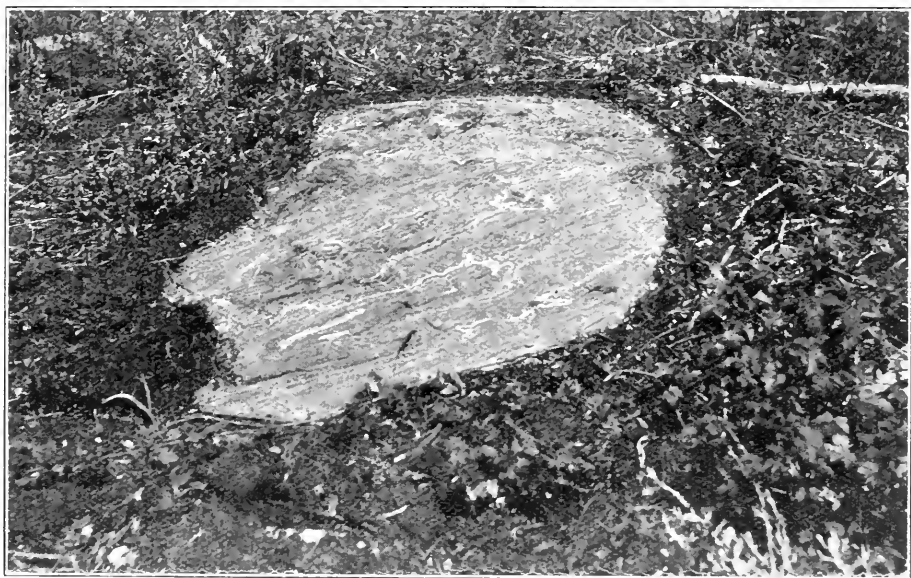
Still farther south one finds green and gray schist and another band of conglomerate, all having a strike of nearly east and west. A quarter of a mile south of the north line of the location there is a third band of conglomerate, succeeded by a few paces of greenstone, and then swamp.

Evidently there has been sharp folding, repeating the conglomerate and the band of Iron formation several times. Afterwards these rocks and their accompanying green and gray schists were greatly disturbed by the eruption of gabbro. The small amount of fair ore seems due to the action of the gabbro.

This area of rock rises as a low island out of a great expanse of sand plain and swamp

Locations A L 413 and 416

The most extensive outcrops of Iron formation in the region are in A L 413 and A L 416, where a considerable amount of stripping and diamond drilling has been done and a camp has been made including several good log buildings. Here also the rock really forms low islands in the drift and swamp, and it is hard to say how widely the formation is distributed beneath its covering, since in several places stripping away the moss shows banded jasper running under the swamp.



Crumpled Iron Formation, 2 miles east of Poplar Lodge.

All the known outcrops were carefully examined and mapped on a large scale as the most promising in the region.

The Iron formation in this range is non-magnetic, showing the absence of magnetite, and our work could be done with the ordinary compass instead of the dial compass needed on the northern and southern ranges. In general the formation consists of interbanded dark blue or black hematite with a brilliant lustre, and bright red jasper. As these have often been crumpled in the most extraordinary way and then shattered and seamed with narrow veins of white quartz, the rock as exposed on glaciated ridges is exceedingly showy. In general however it is hard to get more than a few inches of fairly solid hematite free from jasper.

The crumpled Iron formation does not occur in wide and long bands, but is found in strips a few feet wide with gray schist between, the latter containing some crystals of siderite. The schist runs in the main parallel to the banded jasper, but sometimes cuts across it. The strike is about 70° and the dip 80° to the north.

From the intricate relationships of schist and jasper they appear to have been squeezed and folded at the same time and to have been plastic when acted upon, since

the jasper is usually sharply bent with no hint of fracture or brecciation. The compressive force acted probably for a long time, since the narrow quartz veins crossing the other rocks are thrown into complex crumplings also.

The Iron formation shows near the camp in four outcrops separated by swamp and drift, but probably stripping would show them to be connected in reality. Beginning at the north an outcrop 800 feet long and 150 feet broad is found at the southwest corner of A L 413, and a narrow strip occurs on the southern boundary just south of the main body. The general strike is about 65° with many local bends and crumplings.

Two hundred feet to the south of the large area just mentioned is a smaller band 300 feet long by 40 broad, in the northwest corner of A L 416, having a strike of about 75° .

About 100 feet farther south is the fourth area, 450 by 300 feet in dimensions, the banding having about the same strike.

In the Northern and middle areas the banded jasper makes up not much more than a third of the whole, but the rock is too poorly exposed to give definite amounts. In the southern area several sections are pretty well disclosed by stripping across the strike. In one of the most complete the jasper and schist were measured up for a breadth of 126 feet, showing eleven bands of jasper and as many of schist. At the north end there were eleven feet of jasper and lean ore followed by two feet of schist, one and a half feet of jasper, etc., the total width of jasper and lean ore being 79 feet out of 126 feet. In the next stripping there were six bands of jasper running in width from 10 feet to $30\frac{1}{2}$ feet, 113 feet in all, in a total width of 175 feet, so that the banded jasper and lean ore made about two-thirds of the whole. Probably the sideritic gray schist should also be reckoned to the Iron formation, though it is not very high in iron.

The greatest width measured across the strike is 700 feet, the greatest length something over 800 feet; but there is good reason to believe that the formation continues to the east and west beneath the swamp, and probably has a greater width than that measured. The strike varies from 60° to 80° and the dip is always steep. It is possible that there has been reduplication by close folding, but no direct evidence of this was found.

About 500 feet southeast from the southern outcrop described above, rock begins to rise above the swamp, and outcrops are frequent over most of the eastern half of A L 416, gray schist being the most common, though banded jasper occurs on almost every outcrop in greater or less amount. Some slate and green schist are found also. The usual strike is from 80° to 90° , i.e. about east and west, and the dip is vertical.

The jasper was traced for a third of a mile eastward into H F 1, where the drift cuts it off, and no further outcrops were found to the east. A small patch of jasper was found in the southwest corner of A L 416, completely surrounded by swamp.

The Iron formation near the camp has been found from point to point for five-eighths of a mile, with a total width of a little more than a quarter of a mile; and it may be supposed to be still more extensive, since it sinks everywhere under swamp and drift. It is, however, almost always greatly mixed with schist, in most cases forming less than half the total area of the outcrops, the largest proportion of banded jasper and ore occurring near the camp. The thickest seams of ore observed occur in the eastern part of A L 416, where some finely banded strips of brownish red hematite have a thickness of a foot or two. While the ore is nearly pure hematite in a few places, in others it grades into slaty material with only a little of the sesquioxide, and it is not always easy to determine the line of demarcation; since black slaty bands looking like ore seem to replace it. In general the Iron formation grows leaner and more slaty toward the east until lost about 200 yards east of the boundary between A L 416 and H F 1.

Location A L 412

The only other large area of Iron formation observed in the central range crosses the line between A L 413 and A L 412 near the northern end of the two locations, separated by a third of a mile of swamp and sand plain from the areas to the south and southwest near the camp. A stripping shows a similar mixture of banded jasper and ore with gray schist. In 299 feet the section from north to south presented 1 foot of lean ore, 37 feet of gray schist, $84\frac{1}{2}$ feet of drift, $29\frac{1}{2}$ feet of lean ore mixed with schist, 50 feet of gray schist, $\frac{1}{2}$ foot of ore, $67\frac{1}{2}$ feet of gray schist with some streaks of ore, 15 feet of lean ore and jasper, 35 feet of drift, 5 feet of lean ore and schist, and 14 feet of schist with a little ore, running under drift to the south. This section represents about the average.

At some points slate occurs rather closely imitating the lean ore, the two seeming to pass into one another. The rocks strike from 80° to east and west, and have steep dips, often vertical. In one place the original sedimentation planes, as indicated by lighter and darker bands have a strike of 110° , while the strike of the schistose cleavage is 85° ; but this is quite local, and generally the two structures seem to coincide.

To the north of the Iron formation there is a narrow band of drift, followed by a hill of hard green schist and greenstone. To the south is drift with a few outcrops of gray schist; but at one point a little west of the boundary between the two locations conglomerate was found, running under the drift.

This area of iron formation is probably a continuation of the area described from the north end of A L 414 to the west, from which it is separated by about three-quarters of a mile of sand plain and swamp. The strike of the banding points in that direction, and the finding of conglomerate to the south is a point of resemblance. Ore has been found here over a length of 1,200 feet from northeast to southwest, with a width of 600 feet, but except in the southern part, represented in the section given, the jasper and ore are very thinly scattered.

Location H F 5

The last known outcrop toward the east of the Iron formation in the Central range is found in the north half of H F 5, a mile and a half nearly due east of the area described above, sand plains and the valley of Sand creek intervening. The first ore is seen about 400 paces east of the boundary between H F 4 and H F 5. There is the usual association of banded jasper and hematite with slate and gray schist, but the relative amount of ore is less than in the other areas. Part of the material is bright red, but most of it is dull and slaty in character. The widest band of iron-bearing rock is about ten feet across, but there are several much narrower ones in the gray schist. The strike of the schistosity is from 60° to 70° , and in one place an appearance of bedding had a direction of 80° as compared with 60° for the cleavage. To the north a ridge of hard green schist with some greenstone puts an end to the formation and encloses a small band of conglomerate; while to the south swamp and drift cover the solid formations.

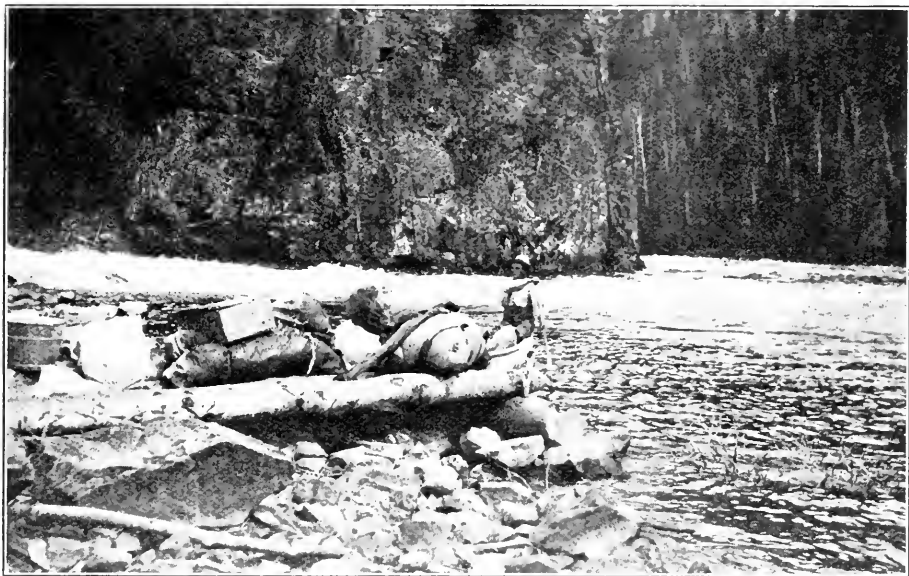
A small patch of red jasper and ore was found to the east, not far from the eastern boundary of the location, but this could not be traced for more than a few feet east and west on a hill of greenstone and green schist.

The outcrops of Iron formation extend from east to west about 1,000 feet, and from north to south about 100 feet, but they are sparsely scattered in the general schist and give little hint of ore bodies of any importance.

This small strip of Iron formation is certainly not continuous with the areas described to the west and southwest; for green schist devoid of jasper or ore extends for nearly a quarter of a mile westwards before the solid rock is covered with drift. It may be that these separate areas of Iron formation are really the lowest parts of canoe shaped

synclines, the upper parts and the connecting links between the areas having been eroded away.

Summing up matters for the Central range, outcrops of jasper and rich or lean hematite have been found in six areas of considerable magnitude, scattered through a plain largely covered by sand and peat bog. From east to west they extend three miles with an average strike of 70° or 80° ; while from north to south, in A L 413 and A L 416, there is a greatest width of five-eighths of a mile, over 3,000 feet. Whether some of these different areas are really connected beneath the swamp and sand plains is uncertain, but fairly probable. While the width of the formation is unusually great, the banded ore and jasper is generally much interrupted by interbedded gray schist, which often contains a good deal of siderite, but must be looked on as greatly diminishing the total amount of iron in the formation available for concentration in secondary ore bodies. In the close interbedding of schist with the banded silica and iron ore, this iron range presents a feature seldom found in other iron ranges of the lake Superior region, a feature which cannot be considered promising; but taking into account



Landing, Split Rock Portage, Nipigon river.

the great width of the range, three times the width of the Helen Iron formation, for example, there should still be abundance of iron available for the production of secondary ore bodies. Up to the present, however, no large bodies of such ores have been found.

The Southern Range

The Southern iron range comes within two-thirds of a mile of the Central range near the camp, but is separated from it by steep ridges or hills of greenstone and green schist, and usually also by sand plains or swamps. The Southern range may be reached by a trail from the head of canoe navigation on Sand creek, by following survey lines south of the camp on the Central range, or from the south shore of Stone Standing lake.

Beginning at the southwest end of the range, the Iron formation is first seen on location 830 X towards the northeast corner. Two other locations have been taken up farther west, B T O 3 and B T O 4, but only coarse gabbro or diabase and muskeg were

found on them. About the middle of 830 X the iron range is cut off rather suddenly by a gray rock thought to be gabbro in the field, but proving to be olivine diabase, with rather imperfect ophitic structure, when examined with the microscope. The diabase, probably Keeweenawan in age, is fresh and distinctly later than the rock to the northeast, since it grows finer grained at the contact.

The Iron formation of the Southern range resembles that of the Northern rather than the Central range, containing enough magnetite to make the compass useless. With the black magnetite there is also some hematite, shown by the reddish black color of the powdered material, and a little dull red jasper. In 830 X the band is comparatively narrow, and slaty gray schist lies to the north and south.

826 X and 827 X

In the next location to the northeast, 826 X, it widens out and is much better exposed on a high rocky ridge running through the northern part of the claim, but it is partly covered by swamp and drift on the south. Beyond the drift green schist is found. The greatest width of iron range near the middle of the location is 550 feet, but the southern end, where not drift-covered, contains much less ore than the northern part. Other sections have a width of about 250 feet, about half of which is slate and interbedded schist, but much of the banded material is not very heavy and should be called hematitic or magnetitic slate rather than ore. On one section there is a small fault with a horizontal throw of ten feet.

The north edge of the Iron formation for a few feet against the schist appears to contain no hematite, only magnetite and slaty material, while the bands to the south contain mainly hematite with a few seams of jasper.

On 827 X a good deal of stripping and sinking of test pits has been done, disclosing a smaller width of banded material, but some fairly heavy ore of a blue black color, mostly hematite. Green schist forms the wall rock in some of the pits.

Less than half way across the location a fault plane cuts diagonally across the range, and is followed by drift, but the banded Iron formation reappears on a hill at the east side, though narrower and with more gray schist interposed between the bands. The strike of both Iron formation and schist at this end of the range is about 85° with a nearly vertical dip. The arrangement is probably synclinal, though this was not certainly proved.

In 828 X drift occupies the centre of the location and iron ore is first met with on a hill at the northeast corner, where magnetite occurs with green schist, having a strike of about 60° .

A band of ore at this point is nearly solid magnetite, for a few feet, but this can be traced for only a short distance along the strike.

In 829 X, after a stretch of drift, lean magnetite with green and gray schist occurs near the northern boundary 200 paces east of 828 X. One hundred and fifty paces farther east the band of magnetitic slate crosses the northern boundary and is lost under drift and a tangle of vegetation. On the western boundary of A L 385, about 100 paces north of the northeast corner of 829 X, magnetite and some hematite and jasper are found in green and gray schist, and a little is found 100 paces to the northeast; but beyond this the whole north end of the location is drift-covered.

On the north shore of a small lake at the southeast corner of this location an outcrop of slaty magnetite three feet wide is found, but can not be traced for more than a few feet. The rest of the north shore consists of a steep hill of gray schist and slate.

In all this part of the range the ore is very narrow and slaty, showing much less promise than in 826 X and 827 X, and its strike has somewhat changed, averaging about 70° .

A L 384 to 398

In A L 384, a little north of the corner of A L 385, the Iron formation was found again, and traced for a quarter of a mile to the east as a lean banded ore with slate and a little jasper. A little farther east a small outcrop of conglomerate was found with gray schist on each side. Beyond only drift and swamp is encountered in A L 386, and in A L 387 only drift and green schist, though compass disturbances toward the east side suggest drift-covered magnetite. In A L 388 near the northwest corner a low outcrop of gray schist contains a strip of banded jasper and magnetite 12 feet wide, but boulder clay covers most of the rest of the location, and the same is true of A L 389.

Near the southwest corner of A L 390 some small outcrops of lean Iron formation occur in gray schist, but are lost under drift to the northeast.

No jasper or hematite was found on this part of the range, but only slaty magnetite in thin bands in the wide spread gray schist.



Steamer under construction, South Bay, Lake Nipigon.

In A L 391 the Iron formation is found toward the eastern side running in the direction 60° , mostly as lean and slaty ore, but including some heavy magnetite. The width is about 20 feet at the west end, including strips of green chloritic schist between the bands. The dip is 80° or 85° to the south. Near the southwest corner of A L 392 there is a band of very slaty Iron formation which does not continue the strike of the outcrop just mentioned. Beyond this only schist and drift are seen until A L 394 is reached, where a band of rather lean slaty Iron formation 50 to 75 feet wide occurs near the middle on the north side. In the next location to the northeast only drift, swamp and green or gray schist were observed, and in A L 396 also no Iron formation was found. A small outcrop of gabbro or coarse diabase occurs near the southwest corner of this location and another small ridge of the same rock on the northwest corner. They penetrate gray schist like that associated with the Iron formation, but apparently without ore. A little slaty magnetite is found however a short distance to the north of the location.

In A L 398 this band is continued as slaty ore showing from point to point in small amounts across the north end of the location in association with gray schist. Except

on its western boundary no Iron formation was found in A L 397; but with a jog of about one-fifth of a mile to the north, suggesting a fault, the Iron formation shows itself near the middle of W B 7 where banded ore with a strike of 75° or 80° is found just north of a little creek.

A L 399 and 400

The Iron formation is much more extensively displayed in the next two locations, A L 399 and A L 400, along the south bank of the same marshy creek, having a width of 150 feet or more along some sections, and containing some heavy, good-looking ore with bands of jasper. Gray schist, the associated rock, is more or less interbedded with the richer ore, and increases in amount toward the south on a hill side, until at last only a few slaty bands with little oxide of iron remain. These are the most promising locations of the east end of the range, but are surpassed by two or three at the west end.

The last location to the east, A L 401, shows only drift except for a fringe of gray schist on the north side, and sand plains extend for some distance farther east. South of the location gray schist appears.

Beyond the drift plain to the east a wide belt of gabbro or diabase intervenes before the Iron formation appears again near Windigokan lake.

The Southern range is 7½ miles long, very straight and with few interruptions, except where swamp and drift hide the rock. It has been traced for twice the length of the Central range, but is not nearly so wide. Like the smaller Northern range, it contains a good deal of magnetite as well as hematite and some jasper, while the Central range is entirely free from magnetite. The difference may have been produced by somewhat more energetic folding and metamorphism of the Northern and Southern ranges, driving off a small part of the oxygen from the hematite.

It is probable that the Northern and Southern ranges are each a narrow syncline enclosed in the gray and green schists of the Keewatin; while the Central range may represent a number of parallel close folds, less vigorously compressed in the mountain building process.

The total area of Iron formation in the three ranges is large, but the interbedding of barren slate and gray and green schist greatly cuts down the amount of iron contained by them. Nevertheless, there has been plenty of the metal to form ore bodies by downward concentration in several parts of the field, the most promising localities being those near the camp in the Central range, and the west and east ends of the Southern range.

If the assumption is correct that the ranges consist of the lower parts of greatly denuded canoe-shaped synclines, the green schists enclosing them should afford fairly impervious basins. In only one case, A L 414, was the Iron formation discovered to be interrupted by a dike, giving a possibility of a basin cut off from some pitching syncline; and here there is a small amount of good ore.

The wide spread muskegs and sand plains make it difficult to work out the structural relations completely enough to give definite ideas as to the attitude of the basins enclosing the Iron formation.

Character and Relationships of the Ore

While the Iron formation is widely and thinly diffused in many cases, and intermixed with much slate and schist, there are a few places where seams of a few inches or a foot or two of ore occur, suggesting secondary concentration on a small scale. Generally even these richer parts show a small amount of interbanded silica, often in the shape of jasper; but when broken so as to expose the shiny surfaces of blue hematite the ore looks very attractive. Assays show however that even at these points the percentage of iron is low, though there is very little in the way of injurious impurities,

minerals suggesting sulphur and phosphorus being largely absent, and titanite minerals entirely so.

The region was visited in 1900 by Mr. J. Watson Bain, who collected a number of samples from the Southern range, afterwards assayed with the following results:

	1.	2.	3.	4.	5.
Metallic Iron.....	38.66	30.06	37.19	37.79	34.02
Silica.....	40.60				
Sulphur.....	traces.				
Phosphorus.....	traces.				
Titanium.....	none.				

No. 1 was the best sample; No. 2 represents an average sample of the formation for a width of 82 feet; and No. 3 an average of 54 feet, excluding the leaner part of the outcrop. No. 4 was taken in the same way, but 100 feet west, and No. 5 from 300 feet east, all apparently being from location 826 X.⁷

A specimen of magnetite and hematite mixed, the richest looking ore obtained by myself from the Southern range, on location 826 X, yielded 45.27 per cent. of iron (soluble), and .52 per cent. of iron in the residue, when assayed at the Provincial Assay office in Belleville; and the best specimen from 827 X gave 34.20 per cent. of iron.

Three samples of ore taken by myself from the Central range gave similar results when assayed at Belleville:

	1.	2.	3.
Hematite (iron soluble).....	43.74	36.86	39.66
(iron in residue).....	.45	.60	.35

Nos. 1 and 2 are from H F 5, and No. 3 from A L 414.

In a report on the region by Prof. Willmott, communicated by the kindness of Mr. Henry Weill of Buffalo, hard blue hematite from a lens on the surface is stated to have the following composition:

Iron.....	64.42
Silica.....	3.80
Phosphorus.....	.071
Manganese.....	.10

This was probably a carefully selected sample, since the average of the ore penetrated by drill holes is stated to be only 40 to 50 per cent.

Three drill holes were put down on the iron range, on locations A L 413 and A L 416, the latter being south of the former, one by Mr. Flaherty, and two by the Algoma Commercial Company, one of them under the direction of Prof. Willmott.

The first hole, on the north side of the formation, was sunk 628 feet at an angle of 45° to the south, equivalent to 440 feet across the formation. "It passed through a number of bands of lean ore varying from two to sixteen feet in thickness and from 40 to 50 per cent. in iron. A second hole, which was really put down first, started directly over the bottom of the first and was bored for 542 feet at an angle of sixty degrees. This crossed 271 feet more of the formation. 'The core revealed continuous jasper with narrow bands of hematite, and at the bottom a passage into quartzite.' The portion reported as jasper contained a large amount of iron and the 'narrow bands of hematite' were nearly pure ore. A third hole crossed the balance of the formation with similar results."

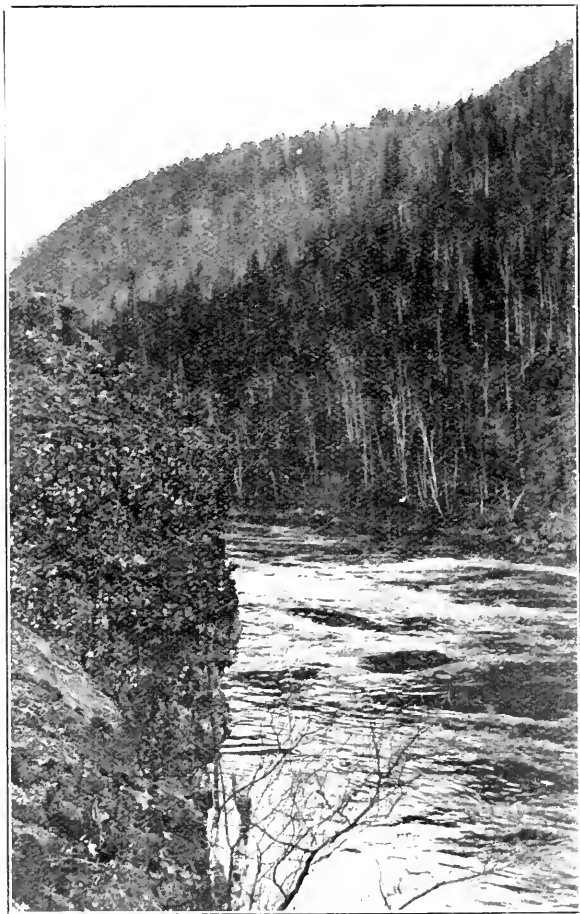
The above quotation from Prof. Willmott's report, kindly placed at my disposal by Mr. Leitch, gives a good general idea of the relations of ore and country rock on the two locations.

Adding up the amounts of ore recorded in the borehole of 628 feet there are in all about 36 feet on the dip of 45°, or about 25 feet measured horizontally. The other two

⁷Bur. Min., 1901, p. 213.

records show about 7 feet of ore each, which amount to $3\frac{1}{2}$ and 5 feet respectively; so that the total width of ore shown in the section cut by the drill holes is about $33\frac{1}{4}$ feet, the rest being mainly jasper and gray schist.

In general it may be said that in the aggregate there is a considerable amount of lean ore with comparatively small amounts of injurious impurities, but generally in narrow lenses separated by several feet of jasper and schist. It is of interest to note that ore was struck at a depth of 414 feet, showing that the formation is not shallow.



On Nipigon river.

Very little pyrite occurs in the banded silica or ore, but the intervening gray schist generally contains small crystals.

Thin sections of the ore show minutely crystalline silica disseminated through the magnetite of the Northern and Southern ranges and the hematite of the Central range. Where magnetite is the ore there is a possibility of magnetic concentration; but the feebler magnetism of the hematite would probably render it incapable of concentration by this method. In any case the particles of ore are small and would require fine pulverization and subsequent briquetting or agglutination to make it available for the blast furnace.

In some of the "blue" hematite ore there is a considerable amount of chlorite instead of finely granular silica mixed with the oxide of iron. This accounts probably for the iron in the insoluble residue reported in the assays given above.

As the Northern range seemed on the whole lower in grade than the others, no samples from it were sent for assay.

Petrography of the Keewatin

Much the larger part of the area near Poplar Lodge, not covered with drift, consists of greenstones and various green and gray schists belonging to the Keewatin. In some cases these rocks include pillow structures and amygdaloidal phases, and in others there are greenstone breccias connected with them, all, probably due to surface volcanic action. It may be that some of the chloritic schists and phyllites also are re-crystallized ash rocks, and therefore of volcanic origin. Many of the greenstones, however, show no traces of a volcanic source, and must be looked on as diabases or other basic rocks which have cooled at some depth below the surface; and mixed with them are some porphyrites and quartz diorites, perhaps of later age, which are almost certainly plutonic rocks. Much more time than we could spare for the purpose would be necessary to separate these rocks in the mapping, so they are all included in the same color.

Another type of rock, gray schist or carbonate schist, often associated with the iron ranges or parallel to them, has been separated where possible, but often these schists are so interbanded with the others that they could not be indicated on a map of the scale adopted. The gray and carbonate schists may be ordinary sediments or chemical sediments and not of eruptive origin, but this has not been established with certainty.

In taking up the petrography of the Keewatin the plutonic rocks, as being the best preserved, will be considered first, and the more highly metamorphosed greenstones and schists afterwards.

The exact relationship of the Keewatin schists to the Iron formation is not clear, since there are often gradations between the two rocks, and the banded silica and ore are often interbedded with gray schist or arkose or slate in very intricate ways, the contorted bands of Iron formation in the Central range being sometimes enclosed in gray schist as a matrix. This may be due to the deposit of varying materials as sediments, or to the close folding of small synclines and anticlines with the gray schist beneath, the whole being squeezed and bent, when the softer schist yielded more easily, adjusting itself to the twisted and often broken bands of the harder banded silica and jasper.

Older Eruptives—Partly Plutonic

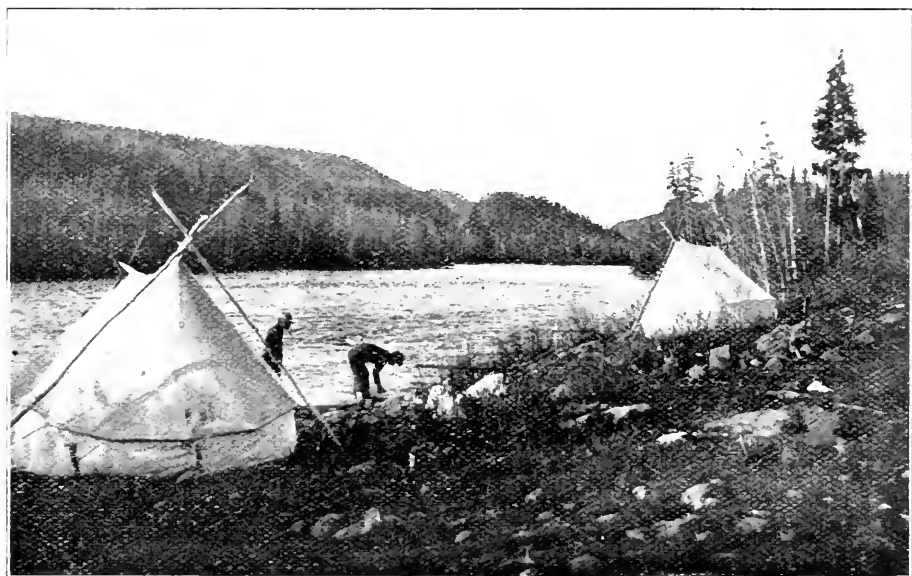
The most acid variety of the plutonics occurs a quarter of a mile north of the line between A L 408 and 409, where it rises as rugged hills. The rock is coarse grained and pale gray, suggesting granite, and thin sections show a very large amount of quartz of granitic appearance; but the feldspars are more than half oligoclase. All the feldspars are greatly decomposed into turbid materials obscure in character, apparently kaolin, but with some epidote present also. The plagioclases tend to be idiomorphic. The darker silicates are green biotite and a little green hornblende, the two together making up perhaps a tenth of the rock. As there is very little magnetite, it is evident that the rock is of a highly acid type, grano-diorite or acid quartz-diorite.

Iron pyrites, copper pyrites and molybdenite are disseminated in small particles through this rock.

A quarter of a mile to the east, in A L 407, a distinctly granular rock of a grayer color is found mixed with the more obscure greenstones, and proves under the microscope to be quartz diorite, with less quartz than the rock described above, and with a large

amount of the dark minerals, chiefly hornblende, but with some biotite. The feldspars are very turbid, but appear to be entirely plagioclase (mainly oligoclase) with a tendency to crystal form. In the thin section examined there is a good deal of titaniferous magnetite, partly changed to leucoxene, and a little pyrites.

A few small outcrops of porphyrite occur in connection with the Central iron range, one of which, from near the camp, may be described. The rock is dark green with a compact ground mass enclosing many small greenish white feldspars. Thin sections show the ground mass to consist almost entirely of chlorite, sometimes in radiating clusters of scales, with a little saussuritic material. The phenocrysts, often well formed, have the extinction angles of oligoclase or andesine, where not too much weathered to show the original twinning. Some of them have been broken and the parts shifted, narrow bands of chlorite filling the spaces between. A very few large anhedral of augite, fractured and with the parts somewhat separated, give the only other evidence as to the original composition of the rock. Very little magnetite occurs in the ground mass.



Camp on Nipigon river.

Besides the rocks mentioned above in which some of the minerals are still recognizable, there are large areas which one can only call greenstone, meaning thereby somewhat basic eruptives in which the ingredients have been completely rearranged, mainly into chlorite and fibrous hornblende with some quartz and saussurite representing plagioclase feldspars. They are unsatisfactory rocks to study, and will not be described at length.

They often include parts which have the forms of surface volcanics, pillow structure and scattered amygdules, filled with chalcedony or quartz or a rusty weathering carbonate.

In other places they pass into breccias made up of angular fragments of all sizes from tiny grains up to blocks two or three feet in diameter. The only specimen of these breccias studied in a thin section has the fragments completely replaced by aggregates of chlorite, fine grained silica, carbonates, etc. Some of the paler fragments appear to be microfelsite. In one such pale compact fragment there are numerous irregular patches of calcite with a rim of chlorite, not rounded like amygdules, however.

A thin section of a pale green amygdaloid consists mainly of small crowded feldspar laths streaming in varying directions as a result of flow. The laths are completely turned to saussuritic substances, and the spaces between consist now of chlorite and a grayish carbonate with some magnetite. An amygdule contains a fine mosaic of quartz in the centre with calcite, epidote and chlorite about it. The original lava was probably a basalt.

Schists

There is no sharp line of demarcation between the greenstones and the green schists, but the latter have a parallelism of the re-crystallized minerals which is lacking in the former. Many of the green schists show suggestions of fragmental structure in thin sections, and may have been volcanic ash or even water-formed arkose in the beginning. In most of them there are quartz grains, often with a radiating rim of chlorite scales, and much decayed feldspars, generally plagioclase, with chloritic substances and small amounts of carbonates between. In some sections the fragments have clearly been broken and shifted a little, as a result of squeezing and shearing such a rock as quartz diorite or quartz porphyrite.

Other specimens are probably slightly re-crystallized arkose, the fragments being due to the action of water rather than crushing in mountain building.

A puzzling group of gray or brownish schists is found interbedded with the Iron formation or occurring with the green schists. They often weather rusty, showing that they contain a considerable amount of iron; and seem in some cases to contain a good deal of siderite, so that they might almost be included as a phase of the Iron formation. In most cases, however, the carbonate appears to be ankerite, containing magnesia or lime as well as iron.

Thin sections vary in composition, some consisting mainly of very fine textured quartz and feldspar with sericite, having 20 per cent. or more of the ankerite crystals disseminated through the mass. They have the appearance of felsite schists enclosing crystals of some carbonate. Others contain fragments of quartz and plagioclase along with numerous patches of ankerite, suggesting an origin from a crushed porphyrite or else an arkose.

On the whole, the carbonate schists resemble phases of the Wawa tuff of the Michipicoten iron region, but seem to contain more iron and less silica.

Only three of the slates have been studied "in thin section," and they vary greatly, one having the character of a phyllite, consisting of minute anhedral quartz, feldspar and chlorite, with many small knots of rutile and a very few slender tourmalines; the others containing no rutile but innumerable crystals of magnetite. The latter variety was taken from near the Iron formation, and might be considered a very lean variety of the banded silica, but for the presence of minute crystals of plagioclase.

True slate with clastic material not yet entirely re-crystallized was not found, the black slaty rock getting its color from magnetite.

The black carbonaceous slate with pyrite, so commonly associated with the Iron formation in other parts of Ontario, has not yet been found in the Nipigon region.

Later Eruptives—Probably Keweenawan

In a number of places small bosses or dikes of basic eruptives penetrate the Keweenawan, not infrequently cutting off the Iron formation or penetrating it. These have generally the habit of diabase or gabbro, and probably represent the channel by which the Keweenawan lavas reached the sills of the Animikie or the surface as volcanics. The overlying rocks with which they were once connected have been destroyed, leaving only the stumps or necks now to be described. Only one small outcrop has been found in the Northern range; and only two samples were collected from the Central range; while

most of the outcrops occur in the Southern iron range or the coast of lake Nipigon south of Poplar Lodge.

Of the specimens collected from the Central range, one comes from a dike cutting the schist and Iron formation in A L 414, having a length of 250 paces and a width of 40. It is gray with a greenish tinge and rather coarse grained. Thin sections show a little quartz, sometimes with a rude micropegmatitic structure, a rather small amount of andesine, and a very large amount of brownish augite, often somewhat idiomorphic and occasionally twinned parallel to the longest axis. The augite makes up nearly two-thirds of the rock, but is more or less re-arranged into hornblende and serpentine. Some large masses of magnetite and a little pyrite represent the earliest crystallizations of the magma. Though the rock contains a comparatively small amount of plagioclase, it may probably be called gabbro.

The other outcrop of eruptive is a small one near the east side of A L 416. The rock is fine grained and dark green with many small paler green phenocrysts. Thin sections show a greatly weathered groundmass now consisting chiefly of serpentine, in which are well shaped turbid crystals of plagioclase and a very few portions of augite. Whether the groundmass was originally of basic glass or of fine grained augite, etc., could not be determined; and the general habit of the rock is so different from the Keweenawan eruptives that it should perhaps be placed in a different and older class.

Basic eruptives occur at several points along the Southern range, and specimens were collected from three localities, which will be taken up in order from east to west.

The most easterly outcrops are on the north and south sides of A L 396, where small bosses of greenish gray eruptive rocks penetrate the usual Keewatin schist. At the northern outcrop the rock is porphyritic in part, enclosing greenish masses of plagioclase half an inch or more in diameter, the masses usually consisting of more than one individual. Thin sections show the matrix to consist of about equal parts of labradorite and augite. There are small amounts of secondary hornblende, magnetite, pyrites and micropegmatite, the latter lying between the somewhat lath-shaped feldspars. The feldspars are somewhat ophitic in form and in relationship to the augite, so that the rock stands between diabase and gabbro, with a porphyritic separation of the feldspar

The larger outcrop of gabbro on the southern boundary of A L 396 is more basic, and not porphyritic; but consists of the same minerals. Augite and secondary hornblende make up three-fourths of the thin section examined.

Eruptive Contact on 830 X

The eruptive which cuts off the Iron formation about the middle of 830 X, at the west end of the Southern range, probably extends under a swampy tract to a large area well seen in B T O 4, and may continue to the coast of lake Nipigon two or three miles south of Poplar Lodge. At its edge against the Keewatin schist and Iron range the rock is very fine grained, but becomes rapidly coarser as one advances westwards. The rock is ophitic, and consists chiefly of labradorite and augite in about equal amounts with a sprinkling of magnetite, and a little olivine. It has the usual characters of dikes and sills of the Keweenawan eruptive where it penetrates the Animikie.

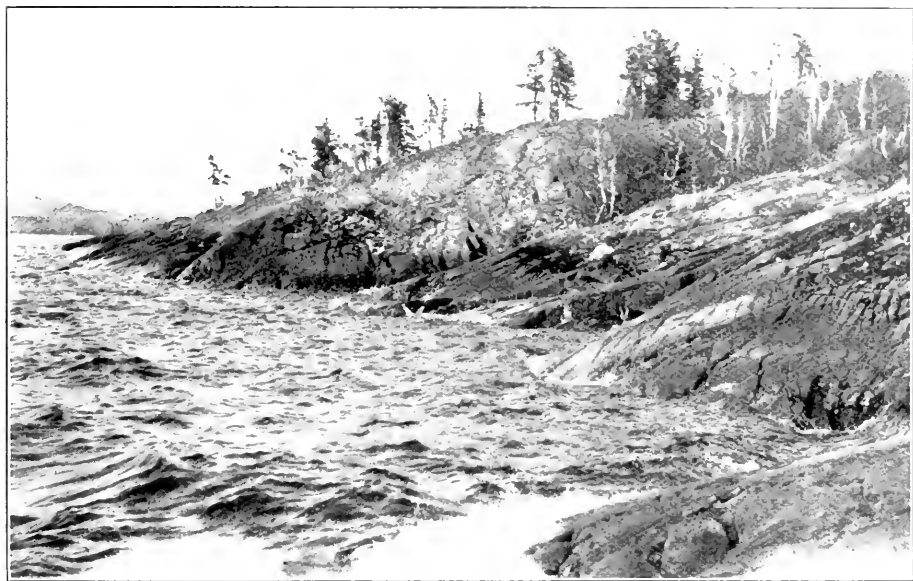
The rock to the west was touched only on a promontory on the lake shore, where it looks like the diabase from 830 X, but is much coarser in grain. Thin sections show some differences, however; since there is a small amount of quartz present in the form of micropegmatite, and the shapes of the plagioclase crystals correspond rather to gabbro than to diabase. If it was not probably continuous with the rock described before, one would naturally describe it as gabbro, though some of the feldspars are platy and project into the augite masses.

As an addendum to the basic eruptives of the Southern iron range two other specimens may be described, one from Halfway point on the east shore of lake Nipigon half-

way to its outlet into Nipigon river, the other at the rapids with which Nipigon river begins.

The first specimen was taken from an island off the point, where a cliff of rough, pitted, dark gray rock rises from the water. It is very coarse textured and differs in appearance from the usual diabases of the Keweenawan. Thin sections consist chiefly of augite and olivine, in about equal amounts, the latter partly turned to serpentine. A little plagioclase is wedged in between the augites, not more than a tenth; and there is much magnetite scattered through the sections. The only other mineral of importance is biotite of a red brown color, occurring in small quantities. The rock comes nearer to the picrites than the gabbros in composition; but may be a very basic phase of the Keweenawan olivine gabbro or diabase.

A somewhat similar rock from the portage past Virgin falls, at the second locality, shows more of the plagioclase, perhaps one-eighth of the whole, the rest consisting of



End of Flat Rock Portage, South Bay of Lake Nipigon.

augite, olivine, a little mica and magnetite with some decomposition products. This rock may be described as intermediate between picrite and a basic gabbro.

From the examination of the thin sections of diabase or gabbro mentioned on previous pages, it appears that the Keweenawan basic eruptives have quite a wide range in composition, from augite-olivine rocks with very little plagioclase to diabases with no olivine and a considerable amount of quartz in micropegmatite. The bases of the channels which supplied the usual olivine diabase of the Animikie sills seem to have undergone much more differentiation than the sills themselves, which appear to be pretty uniform in composition.

Rocks of Flat Rock Portage

On our way to the Poplar Lodge iron ranges we turned off from the usual route at lake Hannah to complete our outfit at the South bay of lake Nipigon. The previous route had been through Laurentian granite or gneiss, generally low-lying, or between steep walls of diabase resting upon the Laurentian. In many cases the thick flat-topped sheets of diabase rose as imposing cliffs in canyons of the river, but no time was taken to examine them in detail.

Being delayed by a storm on Flat Rock portage, between Hannah lake and South bay, there was an opportunity to study the diabase of the region. For three-fourths of a mile the path crosses a gently undulating or perfectly flat surface, evidently the top of one of the diabase sheets of the region, once probably covered by Animikie (or Nipigon) sediments, now completely removed from the much harder and more enduring sill of diabase, leaving its upper surface almost intact in many places.

The diabase surface, where not exfoliated, is very fine grained and broken into polygonal shapes a few inches or a foot or two across with a sunken margin half an inch wide. The appearance is that of the ends of columns which have shrunk a little apart leaving a narrow fissure to be filled later. The reddish filling of the marginal seam does not appear to go far down, and is probably only a part of the diabase attacked by percolating water at the fissure.



Columnar parting of diabase, Flat Rock portage, Lake Nipigon.

The surface of the freshest polygons was often covered with faint curved ridges always convex toward the northeast, probably a flow structure, showing that the molten diabase pushed northeastwards between the layers of Animikie.

Several very small dikes of fine grained granite have penetrated the diabase in various directions, in some cases having apparently followed the rims of the polygons mentioned above. The largest dike observed is a foot wide and is traceable for a considerable distance.

As the diabase sill is probably Keweenawan in age, the narrow granite dikes must be still later, Cambrian or Post-Cambrian: like the narrow granite dikes found in diabase dikes near Sudbury.³

Thin sections of the surface rock of the sill show a composition like basalt, with a large amount of former glass, now rearranged into turbid, vaguely polarising minerals, sometimes nearly opaque, at others more transparent, enclosing minute black cubes of magnetite. Embedded in this ground are many tiny laths of plagioclase, generally split or frayed at the ends, and a few larger phenocrysts of plagioclase and still fewer of augite. One well shaped crystal of olivine was seen. The rock might be called

³ Bureau Mines, 1905, Part III., p. 124.

epi-basalt or perhaps more appropriately, to correspond with the coarser textured parts of these sills, fine grained diabase porphyrite.

The small granitic looking dikes penetrating the diabase contain much quartz, partly intergrown rudely with the feldspar as micropegmatite, some orthoclase, some microcline and much oligoclase, all badly weathered. The bisilicates are badly weathered also, but seem to be chiefly hornblende, perhaps augite originally, with a little biotite. Epidote occurs as a secondary mineral. The rock should perhaps be called quartz diorite, from the large quantity of plagioclase; but its pink color and the large amount of quartz present suggest granite.

Pleistocene Geology

About one-third of the area mapped is covered with Pleistocene deposits or peat bogs, the latter mainly in the lower levels. The Pleistocene consists especially of old lake formations, though occasionally boulder clay is found, and rarely rock surfaces were observed showing striations, having an unexpected direction, from 60° to 70° west of south, indicating a motion of the last ice sheet from the southern end of James bay. The best marked striae were on the Iron formation in the Central range and on greenstone along the shore north of Poplar Lodge. Boulder clay is found at several points near the foot of cut banks along the rivers, but elsewhere is generally buried under stratified materials.

Much the most important development of the Pleistocene consists of broad plains and terraces of old lake deposits, silt, sand, and gravel, laid down in a great northern bay of lake Warren.

On ascending from lake Superior to lake Nipigon, a rise of 250 feet, terraces occur at various levels up to 170 feet or more above the present lake level, or 1,020 feet above sea level. The following elevations were determined, partly by hand level, but mainly by aneroid:

	Feet above sea
Sand terrace, Poplar Lodge.....	860
Flat of silt and sand, south of mouth of Sturgeon river....	882
Silt plains, near lake Nipigon.....	872 to 915
Sand plain, south of Sturgeon river, 2½ miles up.....	930-938
Rear of sand terrace, about four miles up Sturgeon river.....	947
Sand plain, above falls of Sturgeon river.....	1020

Small sections of the Pleistocene occur on Sand creek, where at one point a foot of peaty clay rises above the water, followed by 14 feet of stratified sand. Near by a cedar log projects from the bank half way down. On Sturgeon river thicker sections are found about three or four miles up, near the first rapid and the falls. One measured by the hand level showed 98 feet of silt followed by 14 feet of sand and gravel. The flat plain extending for a distance inland is undoubtedly an old lake level, and shows some low sand ridges perhaps due to wave work, or else of a dune character.

The great extent of these sand and silt plains formed a very serious difficulty in working out the distribution of the Iron ranges, and it was thought advisable to give the drift and peat bog a separate color rather than to connect up the formations in a problematic way beneath the wide spread mantle of superficial materials.

The hills of greenstone and other rocks rise often very steeply to the height of three or four hundred feet above the sand plains like long islands in the ancient lake.

The bay of lake Warren indicated by these terraces must have included a much larger area than the present lake Nipigon, and have pushed its shore more than 100 miles north of the old beaches recorded by Lawson, Taylor, the present writer and others from observations along the Canadian Pacific railway. This great bay must have been island filled, like Georgian bay of lake Huron, and covered about as large an area.

II.—IRON RANGES EAST OF LAKE NIPIGON

THE RANGES AROUND LAKE WINDEGOKAN

By E S MOORE

Introductory

Reports of extensive deposits of iron ore in the Nipigon region have been frequently circulated during the last few years. To learn of the extent and value of these deposits the Department of Mines began field work there in the summer of 1906, and the writer was instructed by Mr. T. W. Gibson, Deputy Minister of Mines, to act as assistant to Dr. A. P. Coleman in his work on the Iron ranges east of lake Nipigon. On reaching Nipigon village just as Dr. Coleman was leaving the field, the writer received directions from him to proceed to take Windegokan and report on the Iron ranges in the surrounding region.

Very efficient service was rendered during the season in the field, by Mr. T. L. Goldie, B.A., who had also been acting as one of Dr. Coleman's assistants, and who remained in the field until the close of the season.

Considerable prospecting had been done around lake Windegokan by the Algoma Commercial Company and others, and a map of the surveyed claims furnished by the Surveys branch of the Department was of great service in our work.

The accompanying map will give the reader some idea of the geology and topography of the district. In obtaining the material for this map, we followed the plan of pacing all the lines, of making a few offsets into the larger claims, where there were no definite indications of iron range; and where there was any range of importance, of making offsets from the lines, at 150 paces from each other. Compass lines were run where necessary, and if magnetite were present the dial was substituted for the ordinary compass. As our time was limited, we only completed the exploration of the region as far east as the eastern boundary of mining location H F 38.

The writer would here express his appreciation of the kindness of Mr. P. A. Leitch of Nipigon, and others, for generously assisting us in our work.

Nipigon Village to Lake Windegokan

We left Nipigon village on July 4th, and proceeding up the river camped on lake Nipigon the following evening. It is not surprising that the Nipigon river is a favorite stream with anglers and tourists, who visit its banks in large numbers during the fishing season. The water is so clear that splendid speckled trout may be seen lying at the head of the rapids, and the stream is in many places lined with high vertical cliffs of columnar diabase, which make its scenery very attractive to the traveller.

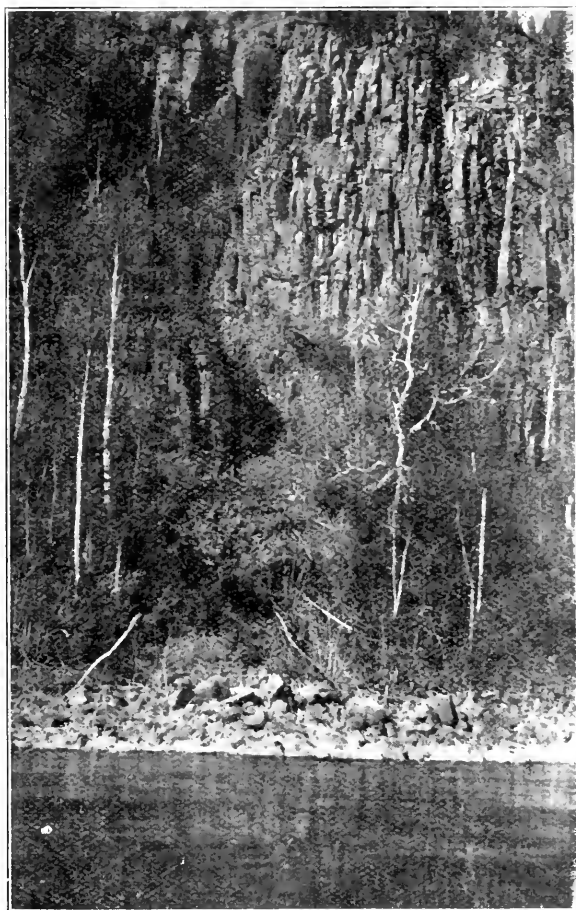
On account of the treacherous nature of lake Nipigon when any wind is blowing, we were held up on its shores for nearly a day by rough water, and then experienced great difficulty in crossing the long bay at the southeast corner of the lake. We next camped at some old shacks about two miles up the Sturgeon river, and after completing a little work there, proceeded up the stream to the foot of the long rapids.

The river is deep, dark and wide below the rapids. At about 5 miles from its mouth there is a short rough rapid with a fall of about nine feet, and at a mile and a half farther up, occur the falls of two leaps, making a total drop of about 39 feet. Nearly three miles from the falls, the long rapids begin, but between these two points there are two small rapids with a drop of not more than three or four feet each.

¹See note on page 118.

The portage around the long rapids is about one and one-half miles long and lies in the route to Long lake. A barometer reading shows the rapids to have a total fall of 99 feet over very rough ledges of diabase.

In the diabase at the foot of these rapids there are some interesting pot-holes from one foot to 18 inches deep and about 6 inches in diameter. In each hole a rounded stone and some gravel was found, which had been used by the water as tools to grind out the cavities. One of the holes will not grow larger, because a stone had become so tightly wedged in it, that it could not be moved.



Cliff of diabase, Nipigon river.

All along the Sturgeon river the sand terraces rise to a good elevation above the stream, and on the portages around the long rapids and to lake Windegokan they may be found from ten feet to 125 feet above the foot of the rapids.

The portage of about two and a half or three miles in length, between the river and lake Corrigan, begins at the foot of the long rapids and runs nearly east, crossing sand plain and muskeg before it rises over a large flat area of diabase, and then descends to the lake. This lake is about one and a half miles long, and is nearly 150 feet higher than the foot of the rapids. A creek flows from near the western end of it to the Sturgeon river, but unfortunately it is too small to be used as a canoe route.

The portage between lake Corrigan and the next lake on the route, which is small and marshy, is about a mile long, pretty rough, and follows near the contact between the schist and conglomerate. From this little lake to lake Windegokan is about 250 yards, and the trail extends along a low area at the foot of a hill of conglomerate.

Topography of Windegokan Region

The map shows lake Windegokan to be about 3 miles in length and divided into two long arms. It is a very beautiful lake containing a number of islands and lying among high hills of schist and moraine. The portage between it and the little lake to the west crosses a water divide, because the water from it flows westward joining the Sturgeon river not far above the long rapids, while the creek leaving lake Windegokan at its northeastern extremity is there flowing northward. We did not explore this creek, so cannot say what course it takes to reach the Sturgeon, nor whether it could be successfully used for a canoe route, though the volume of water is sufficient for that purpose.

Clear creek enters lake Windegokan at the east end, and one is charmed by the splendid display of color in the plants of this stream. Its bottom is covered with clay, sand and gravel and one seldom sees such fine green mosses, algae and fresh water chara as are found there. The water is as clear as some of the springs flowing from our southern limestone hills, but the thirsty traveller is doomed to disappointment when he finds it quite warm. The stream is navigable for canoes at any time to Bear-skin lake, and at time of high water far beyond Clear lake, but it was impossible to use it when we were there because the water was so low on account of the scarcity of rain; the water in the Sturgeon river fell about 18 inches in five weeks.

In the neighbourhood of Clear lake there are morainic hills rising from 35 feet to a much higher elevation, and also low sand plains from 6 to 10 feet above the lake, while around lake Windegokan the sand plains rise from 15 to 30 feet above that lake. To the north of the latter green schist hills rise 125 feet and to the westward 175 feet above the lake, while to the south morainic hills reach an elevation of 80 to 240 feet. Much swamp and many small lakes lie to the west and south of Windegokan.

Watson or Rocky lake, as the latter name might indicate, lies in a rocky hollow surrounded by green schist hills, which on the north side reach an elevation of about 135 feet above the lake. This lake drains southwestward and probably by Sand creek. There is little difference in elevation between it and lakes Windegokan and Tallon.

The arm of lake Windegokan called Dead lake is marshy and slimy, over half of it having not more than six inches of clear water, and it is quite troublesome for canoe travel.

The country as a whole is not nearly so rough as most of the region along the north shore of lake Superior, and it seems to grow less rough towards the eastern end of the district explored.

The Plants and Animals

Only a few of these will be mentioned, and those which will be most likely to prove of interest. The timber is composed mostly of spruce, balsam, cedar, jack pine, white birch, poplar and tamarac. No red or white pine are seen here. The finest cedar was found south of Tallon lake, where some trees have a diameter of 30 inches. A few tamarac and spruce were noticed of similar size, but they were not very common.

The mosses are a great impediment to the geologist and prospector. A great deal of the surface of the ground is covered with moss to a depth of six inches, and it not only excludes the rocks from view but in dry weather causes endless anxiety when fires have to be kindled.

We were attracted by the vast numbers of early wild roses which make some parts of the country around Sturgeon river look almost like a southern flower garden.

It is more by its fish than by its plants that the Nipigon region is known. The river has long been famous for its speckled trout, which reach an unusually large size, and some of the inland lakes contain an abundance of pike, yellow pickerel, suckers and whitefish. Some sturgeon are found in the river of that name, and some bass farther south. If one chose to do so, he could kill pike with a paddle, in Clear creek. The voracious habits of these fish practised on the inoffensive and less aggressive suckers, prove of interest to one who observes them. The writer has seen a small sucker leap from the water to the beach to escape a fierce pike which was pursuing him, and while he was floundering on the shore the pike calmly waited near by to seize him should he return to the water.

A good many rabbits were seen, but few moose or red deer, and no caribou. The Indians say that the moose of this region are small of stature, and what the writer



Noon camp, east shore Lake Nipigon.

has seen of them would confirm the report. Some partridge, bears, wolves, and mink were in the region, but we saw no foxes, lynx or beaver, though they are reported to inhabit the district.

Classification of the Rocks

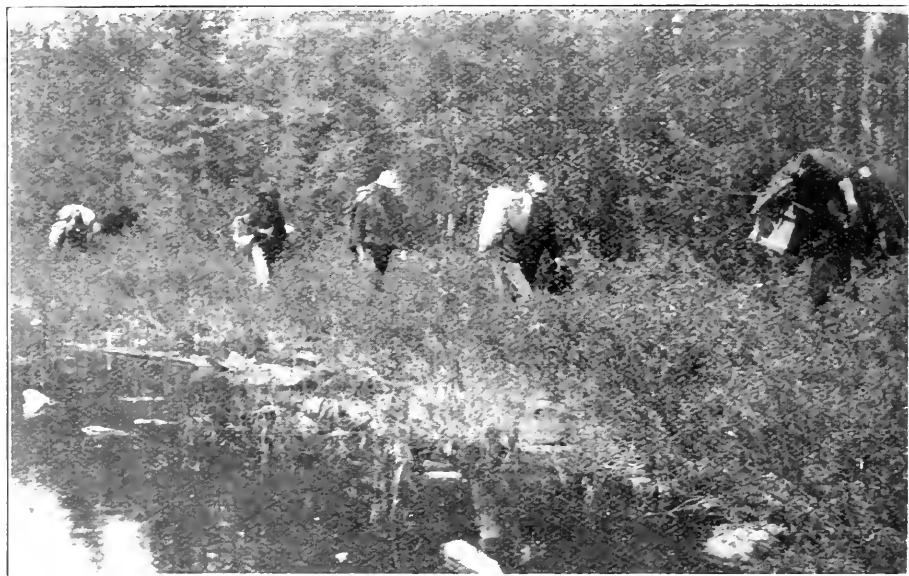
Adopting the classification recommended by the International Committee on the Pre-Cambrian Nomenclature of the rocks in the Lake Superior Region, we would have in the Lake Windegokan district the following series of rocks:

PLEISTOCENE :—Drift and Swamp.
KEWENAWAN :—Basic Eruptives.
LOWER HURONIAN :—Conglomerate.

KEEWATIN { Arkose
Iron Range.
Carbonate Schists.
Green Schists.

It is difficult to decide whether the different members of the Keewatin series are arranged in their proper order of succession, because most of the rocks are badly decomposed and the contacts are so poor and complicated that little can be learned from them. The Iron range fixes a definite geological horizon and most of the green schists are older than that formation, but the case is not so clear with regard to the position occupied by the carbonate schists and arkoses. The former correspond closely in composition to the Wawa tufts of the Michipicoten region, and we have placed them in the same relative position here.

The arkoses, which are widely distributed in the region, are the most troublesome of all the rocks to classify in their proper order. In older works they are commonly included in the Upper Huronian, and on account of the presence of some jasper fragments which were seen in one section from location H F 19, one would suppose that they should be placed in the Huronian above the conglomerate. Another thing which would make it appear as if the arkose were later than the conglomerate, is the absence in



Portaging, Lake Nipigon region.

many places of any sign of schistosity, which is so common in the other rocks. But in some parts the arkoses are quite schistose, and it may be that in others they resisted the forces which caused the schistosity and remained massive, just as portions of the greenstones have retained their original structure, while others became schistose. Also the absence of any considerable quantity of jasper, or any definite relation to the conglomerate, which would fix the relative ages, and the presence in the region of arkoses which are distinctly associated with the green schists, make it seem wiser to place them in the Keewatin.

The conglomerate forms a fixed horizon separating the Keewatin and Lower Huronian. It contains pebbles of practically all the types of rock in the region, and some which are not now found there. The absence of arkose pebbles is significant, but these rocks seem to be rather local, and since the material for the conglomerate has probably been transported some distance, this might account for the absence of these pebbles.

One finds no objection to placing the basic eruptive in the Keweenawan, since it is composed of a large sheet of olivine diabase cutting the other rocks of the region.

The various members of the different series classified will be taken up in detail, beginning with the green schists which are the oldest rocks found in the region.

The Green Schists

The green schists comprise the oldest greenstones of the region and a series of schistose rocks composed of slates, and greatly sheared ash rocks, arkoses, and greenstones. These rocks correspond closely to the Michipicoten schists mentioned in last year's Report of the Bureau of Mines. They are undoubtedly the oldest rocks of the region, and have been the origin of some of the others. They are widely distributed and are generally characterized by their green appearance, which is due to the presence of chlorite and secondary hornblende, the products of weathering of other minerals.

The different types of rocks comprising the green schists can be best considered separately.

Greenstones

These rocks consist of porphyrites with large crystals of plagioclase or hornblende, amygdaloids containing amygdules of quartz or calcite, and quartz diorites. Most of them are badly weathered and not very suitable for detailed study in thin section.

A specimen of a porphyrite taken just east of the southwest corner of location H F 19 weathers brown on the surface to a depth of about half an inch. It is very compact and on the fresh surface is light gray in color and shows many crystals of pyrite. In thin section it shows a great deal of pyrite, some chlorite, very little hornblende, and large crystals of plagioclase, badly decomposed.

It has been suggested that the pyrite in these Keewatin rocks is of secondary origin, having been derived from sulphates through reduction by carbonaceous matter. This is probably the case to some extent in the sediments, but it appears more reasonable to regard it as primary in these greenstones. The pyrite is no doubt the source of the brown iron oxide covering the weathered surface of this rock.

The amygdaloidal rocks which are most common west of Tallon lake are greatly weathered light or dark green rocks, having the cavities filled with quartz or calcite. It is noticeable that calcite is very common among many of these older rocks, filling cracks and cavities, and its presence is readily detected by the action of acid on the rock. A thin section of an amygdaloid which occurs a short distance east of the southwest corner of location H F 23, shows it to be a basic lava with many amygdules filled with chlorite resulting from the decomposition of minerals formerly contained in the cavity, and along the south side of location H F 26 a greatly weathered greenstone occurs which shows no characteristic features in the thin section.

In location H F 34 was found a mixture of greenstone and green schist, some of the former in small patches showing the lava pillow structure.

There are some quartz diorites in the region, and they may not be of the same age as the other greenstones, but as they cannot be classed by themselves they are put in here. They are found west and south of lake Windegokan. The greenstones are not so widely distributed as the green schists, and are most common west of Tallon lake, though a few small outcrops occur scattered over a good deal of the southern part of the region. These rocks have been the origin of some of the schists, but parts of them have resisted the shearing action and largely retained their original and massive condition. They have also exerted quite an influence upon the strike of the schists in the neighborhood.

Banded Slates and Arkoses

The slates are rather widely distributed, but are not in very large masses. They almost invariably occur with the Iron range and although a good indication of the presence of that formation in the immediate neighborhood, they may occur without it. On account of their intimate connection with the Iron range it is difficult to say to what extent they should be considered part of it. They are black or sometimes gray on the greatly weathered surface, and are made up of argillaceous deposits no doubt derived from the disintegration of granite and deposited by the pre-Cambrian rivers. The slates occur on either side of the Iron formation, showing that the conditions existing before the deposit of the Iron range must have been repeated afterwards. They also occur interbanded with the iron-bearing silica, showing that while there was a cessation of the deposit of slate, a deposit of silica occurred.

A thin section of a specimen taken near the jasper in location H F 38 shows interbanded slate and arkose. The slate is too fine grained to show many distinctive features, but contains considerable pyrite in very small grains and some very fine pieces of feldspar. The arkose bands show distinct angular fragments of quartz, pieces of feldspar, much pyrite, chlorite and fine grained material. A few pieces of quartz show evidences of water action.

The bands of slate and arkose vary greatly in width, some being as much as three-quarters of an inch in width, and others extremely narrow; and as these bands must represent the deposits laid down during some regularly recurring periods the extent of the weathering action must have also varied at different times.

There are besides those associated with the slates, some arkoses which in the field have been placed with the schists on account of their schistose condition, but whose age would correlate them with the group of arkoses later than the Iron range formation.

The Green Schistose Rocks

We have yet to consider the true green schists, which are very old rocks and as their name would suggest are green from the presence of chlorite and hornblende. Their origin is partly from sheared greenstones and, probably, partly from ash rocks and other volcanic detrital material. They do not now possess their former constituent minerals, and as they are so badly changed, they are entirely unsuitable for study in thin section.

On the portage between lake Corrigan and the small lake to the east, an old hornblende schist green with chlorite and containing much calcite in the cracks, is found. Along the southern side of location H F 20 there is a distinct hornblende schist in which quartz and hornblende are the chief constituents. A little south of the northeast corner of the same claim was taken a specimen of sheared porphyrite which had contained large crystals of plagioclase, and still farther south occurs a large schist hill about 100 feet high, evidently formed by the shearing of a hornblende porphyrite.

No estimate of the thickness of these rocks can be formed. The dip is usually about 90°, but in the southern parts of the district it is nearly 70° southward.

The strike of the schists in the southern part of the region is about 70°, but at about 600 paces east of the southwest corner of location H F 31 the strike changes from 70° to about 95°.

The Carbonate Schists

The name, carbonate schist, has been applied to those schists which are distinguished generally by their quartz crystals, greatly weathered condition, and yellowish brown color. They are sheared quartz porphyry rocks containing considerable carbonate and oxide of iron, and correspond closely to the Wawa Tuffs of the Michipicoten region. In

the Windegokan district it is almost impossible to say just how they stand in relative age with the other rocks, but we have placed them in the same relative position as the Wawa tuffs whose age has been pretty well fixed. Along the north shore of lake Windegokan they occur intermingled with the green schists, showing that some of them at least are of the same age as some of the latter.

The quartz crystals stand out prominently from a fine grained indefinite ground mass of iron ore and feldspar. The ore is in the form of hematite and carbonate, either siderite or ankerite, the carbonate giving a very active effervescence with hydrochloric acid. The oxide has probably been derived from the carbonate by oxidation. There is considerable iron in the schist, as an analysis of a specimen taken just south of Whitefish lake shows 20 per cent. of hematite.

The distribution of these schists is quite general, but they are found in small quantities. No doubt they were at one time quite widespread, but owing to their greatly weathered condition they have largely disappeared. Their strike and dip correspond closely to that of the associated rocks, being about 70° in the southern part of the region, and east and west in the northern part.



Indian Encampment.

The Iron Ranges

In another part of this year's Report, Dr. Coleman has given an account of the Iron ranges on Sand creek and Sturgeon river. It was supposed that the three distinct ranges found there would be continued beyond the basic eruptive sheet to the north-east. This supposition proved to be only partly correct. Whereas on Sand creek and Sturgeon river the ranges are clearly separate, and one is a considerable distance from the other two, near Windegokan there are no such definite ranges, and the outcrops are more scattered. The two districts are alike in respect to the presence of jasper and hematite in all the bands, and magnetite in two of them. One must ascribe the formation of the magnetite to some local reducing agent, probably carbonaceous matter, as there are no such conditions as those Dr. J. M. Bell reports as always seen where magnetite was found in the Michipicoten region, viz., excessive metamorphism or the proximity of some intrusive mass which had caused reduction by heat effects.

The strike of the rocks of the range in the northern part of the region is nearly east and west and in the southern part about 70° . This difference in the strike brings the eastern ends of the bands rather close together while they are some distance apart at the western end.

The dip of most of the bands is nearly 90° , though in location B T O 1 the dip is about 75° to the north, and in H F 35, 70° southward, while between the two outcrops a narrow band dips at about 90° . This might suggest a closed fold having the anticlines removed by erosion, the outer limits of the anticlines dipping north and south and the inner ones standing vertically, but in the remainder of the bands the dip is practically always 90° or indefinite, and one concludes that in most cases the folding has been on a smaller scale and more complicated and irregular.

The folding and crumpling within the banded silica is very elaborate, and suggests the application of pressure from several directions, as in some cases the jasper lying between the bands of slate appears to be folded while the latter is not, and *vice versa*. This condition is evidently due to folding in different planes.

The iron-bearing rock almost invariably lies embedded in a dark slate, or hard slaty schist, and in some cases this slate is distinctly interbanded with arkose of fairly coarse texture. An analysis of a rather pure form of this slate from beside the Iron range on Whitefish lake, shows that some iron is present in it. The composition was as follows: silica, 56.36 per cent; alumina, 18.91; ferric oxide, 6.46; ferrous oxide, 1.50; lime, 2.06; magnesia, 2.93; soda, 2.74; potash, 2.18; loss on ignition, 6.02; moisture, 0.20. This analysis would indicate that while the mechanical deposits were being formed there was a deposit of iron taking place, and that later the chemical deposits of iron and silica increased while the mechanical deposits of material containing these other substances diminished.

It has been suggested that these iron deposits have been precipitated from superheated sea water. It scarcely seems necessary to hold that the water should be superheated in all cases, as amorphous silica may be deposited from water at a fairly low temperature, although in a boulder in the region the writer found a specimen containing hematite and crystals of quartz, which is interesting as showing how these substances may be deposited together from water at a high temperature. It is necessary to suppose that the temperature was high in this case, because quartz is deposited at about 180° or higher, and the other forms of silica at lower temperature.

There are some bands of fine Iron range in the region, but the percentage of iron in them is low. A number of analyses were made by A. G. Burrows, Provincial Assayer of specimens from various parts of the ranges, and the results were quite disappointing, as scarcely any of them showed enough iron to make the ranges of commercial value.

Distribution of the Iron Range

There are three prominent outcrops of the Iron formation, one west of lake Windegokan, one on Still lake, and one northeast of Watson lake. Besides these, there are a number of lesser outcrops occurring in various parts of the region, but they are unimportant.

West of Lake Windegokan

Lying in locations H F 13, 12 and 10 there is a mass of range of considerable proportions. It is composed of gray slate and jasper, in parts very finely banded and from appearance it should yield a fairly good percentage of iron, but two analyses of some of the best of this outcrop show only 35.75 and 36.56 per cent. of iron as hematite, respectively. Much of the mass lies under swamp and drift, and although the drift has been partly removed by trenching it is impossible to say what lies under the swamp. Nothing was seen to justify the assumption that a large ore body exists, the

ore being of so low a grade. There is much schist in some of the range, the dip is about 90°, and there seem to be no particular geological conditions to cause a concentration of ore at this place. This outcrop becomes greatly mixed with schist before running into the eruptive sheet to the west, and also at the east end before disappearing under the drift. Just south of this outcrop and in location H F 11 is a small mass of jasper and banded magnetite.

On Still Lake

In the old location B T O 1 which had been surveyed earlier than the others, there is a large outcrop of Iron range. A large portion of it is excluded from view by drift and swamp, but it extends right through from Still lake to Whitefish, and although at either end it is not more than 15 to 20 paces wide, it widens out in the centre to about 160 paces, disappearing into the lake on the north side.

There is some fine looking range here, but there is much silica in all of it, and it is in places much broken into by schist. The best analysis gives 36.86 per cent. of iron as hematite, which is too low to make ore. The strike of the rock here is east and west, and dip 75° to the north. It is badly excluded from view by drift, so that it was not possible to form a proper conception of the geological conditions of the range, but its dipping under the lake and the size of the mass suggests a possibility of a small lens of ore being found under part of the lake. It is the most promising looking mass in the region, but the low grade of the ore is against it producing much iron.

Northeast of Watson Lake

On the map may be seen a streak of Iron range running from location H F 32 through H F 35 and 39. It mixes with the schist at both ends, and appears at intervals in the swamp all along the line. The widest part of the deposit, about 35 paces, is near the centre of H F 35, and it gradually narrows towards the extremities. The formation is composed of magnetite and jasper, and is bounded on both sides by green slaty schist. A swamp extends most of the way along the north and part of the distance along the south side, and in H F 39 there is considerable magnetic attraction in the swamp on one side of the range.

Some of the best samples of this range would make ore of low grade, as one analysis shows 48.9 per cent. of iron, as magnetite. Considering the narrowness of the band, it would probably not yield any quantity of ore unless perchance magnetic survey work might discover a body of ore now excluded from view. The strike of this band is about 70° and dip 70° southward.

Other Outcrops of Iron Range

There are many other small outcrops of the rock, but none of importance. On the north shore of Watson lake a small mass of jasper and magnetite occurs, which is probably a portion of the same range appearing farther northeast. In H F 10 and 15 streaks of jasper and hematite are found running through the schist. All the small masses scattered over the region and not previously mentioned are of jasper and hematite enclosed in slaty schist and in most cases with vertical dip.

The Arkoses

The arkoses are generally massive gray rocks, weathering brown on the surface, and quite common around lake Windegokan, but scarce in the vicinity of Sand creek or Sturgeon river. They are clastic rocks, having originated from the weathering products of others, laid down by water. The difficulty in classifying them and the reasons for placing them in this relative position are given in the notes on classification of the rocks.

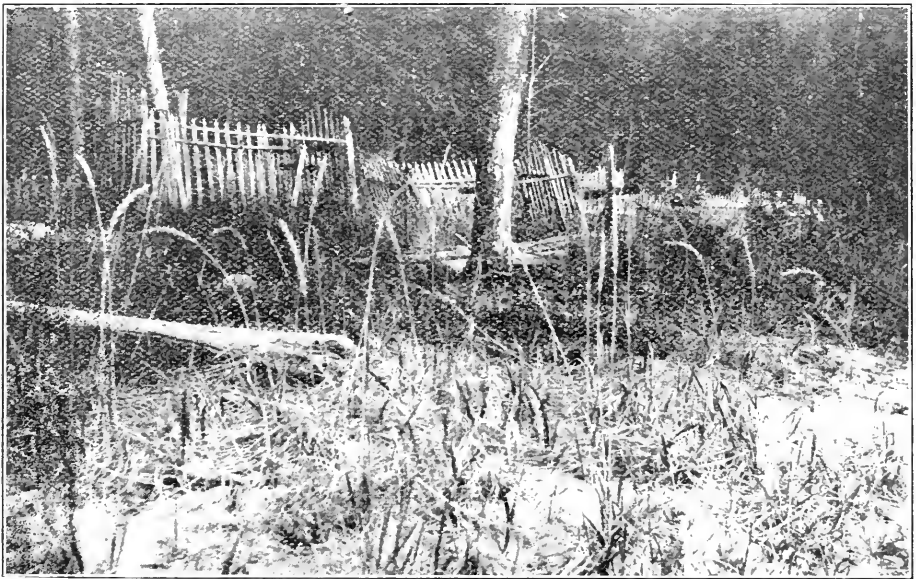
In almost every case these arkoses are more than half made up of angular quartz fragments, and as they make good thin sections for examination, a number of sections

were made from different parts of the region. One from a short distance west of Clear lake shows a few of the quartz fragments more or less rounded and probably water worn. In some specimens the fragments may be seen with the naked eye.

A specimen taken from the long point running out into lake Windegokan on the west side of H F 21 shows in the thin section many angular fragments of quartz, some weathered plagioclase, and some chlorite, but it is peculiar in being the only specimen examined which exhibited fragments of jasper.

Another specimen from near the middle of the south side of location H F 19, and on the shore of Windegokan, very much resembles a conglomerate on account of its concretionary structures, which in the hand specimen look like pebbles. Under the microscope may be seen smaller mosaics of quartz among the angular fragments, also badly decomposed plagioclase, zoisite, orthoclase and chlorite.

Arkoses originate by the disintegration of granite, and the origin of these rocks is an interesting subject. The presence of so much quartz and plagioclase would indicate that they probably originated in this case from quartz diorites and quartz diorite-schists,



Indian Graves, Lake Nipigon.

some of which are found in the region, but which are much more common to the southwest. If these rocks were formed from material *in situ*, a large mass of rock once present in the region must have been transformed, and it seems strange that there are not more jasper fragments in them when there is so much jasper in the region. It is more probable that the material has been transported some distance before being deposited, which also seems to have been the case with that forming the conglomerate, and it has frequently happened in other regions that detritus has been carried considerable distances and then been deposited as arkoses not showing much evidence of water action. If all this material has been brought from outside points and deposited later than the Iron range, it seems probable that it has buried considerable of that formation.

The Lower Huronian Conglomerate

The conglomerate appears in nearly every part of the region explored, but generally in small masses. It is one of the rocks about which there can be no doubt respectively its relative age, and like the Iron range it fixes a definite horizon. It contains

pebbles of green schist, greenstone, carbonate schist, granite and jasper cemented together by a matrix of fine grained green material. The most common pebbles are greenstone, green schist and granite. Jasper pebbles are not very common, but enough were found to fix the relation with the Iron range. The absence of many jasper pebbles when jasper is so common in the region, and the presence of numerous granite fragments when no granite appears in the immediate neighborhood, show that the material for the conglomerate was either derived from rocks which were once exposed in this district and have completely disappeared, or was transported thither from some outside point. It is said that granite exists to the north of this region.

The Huronian has been subject to much the same foldings and contortions as most of the Keewatin rocks in the region, and its strike corresponds with that of the other rocks.

The most conspicuous outcrop of this rock is seen on the north side of lake Corrigan. Here there is a hill of typical conglomerate at least 150 feet high. Its strike is about 70° , but rather indefinite. It is not known how far this mass extends northward. The portages between lakes Corrigan and Windegokan run pretty closely along the contact between this mass and the schist.

On the line along the east side of location H F 27 and just south of Whitefish lake, there is some conglomerate containing pebbles of carbonate schist in a matrix of rusty iron ores. As the rock lies next to the schist, it looks as if it might have been derived directly from it. This was the only patch of this type of rock found. Near the southeast corner of location H F 15, some conglomerate contains distinct jasper pebbles, but as a whole, jasper pebbles in the rock were not common.

The Keweenaw—Basic Eruptive

The only mass of distinctly basic eruptive of this age seen in the region, is the large sheet which is crossed on the portage from Sturgeon river to lake Corrigan. It is at least six miles long and though its width is not definitely known, it is some miles wide. It seems to have flowed out over the other rocks, and presents large flat areas on top of the mass. In the field this rock is readily mistaken for gabbro, as the ophitic structure of the plagioclase is not so prominent as it is in the diabases of many other regions, but under the microscope the thin section shows the well developed lath-shaped crystals of plagioclase, polysynthetically twinned, the crystals of augite, a little secondary hornblende, magnetite, small quantities of biotite and a few crystals of olivine, changing to serpentine. The rock is thus an olivine diabase, which is characteristic of the Keweenaw of this region. The specimens are quite fresh, and are suitable for study in the thin section.

We expected to find that this sheet had cut off the Iron ranges to the southwest from those in this region, but it was found that in every case where the Iron formation meets the eruptive sheet, it had first almost entirely run out into the schist before coming into contact with it. The intrusion of this sheet may have to some extent helped to mix the two formations.

No diabase dikes or small intrusions of this rock were seen here, as in most of the other regions in which the writer has worked.

Pleistocene Geology

The work of the glacier is much in evidence in the Windegokan district. This is shown chiefly in the vast amount of drift which is scattered over the country, in some places forming immense morainic hills, and in others large stretches of swamp, sand plain, or clay on which the most abundant vegetation is found. There are some boulders west of lake Windegokan which contain hematite and must have been transported some

distance, as the ore is not found in the immediate neighborhood in such a direction that the boulders could have originated there.

The highest hills of drift whose elevation was measured with the barometer are about 240 feet above lake Windegokan, and they vary from this elevation to a little above lake level. But the most interesting feature furnished by the Pleistocene era are the sand plains which may be seen all along the Sturgeon river, and which rise on the portage to lake Corrigan 125 feet above the foot of the long rapid. As lake Windegokan has so much higher elevation than the foot of these rapids, the plains only rise from about 10 feet to 30 feet above the present level of the lake, and from 6 feet to 10 feet above the level of Clear lake. These sand plains no doubt represent remnants of the old beaches of lake Warren, and the lakes lie in what was once a long bay of this lake opening towards lake Nipigon by way of the Sturgeon river, and stretching farther up from lake Superior in this region than in any yet explored.

IRON PYRITES IN ONTARIO

By E L FRALECK

Introductory

On the first of June, 1906, the writer, in accordance with instructions received from the Department of Mines, began an investigation of the Iron Pyrites deposits of the Province. Those of Eastern Ontario, being easier of access by means of better developed transportation facilities, were first examined; in almost every instance one can get within a short distance of the prospects by a good wagon road. In Northern and Western Ontario, where deposits are farther apart, and in many cases somewhat inaccessible, recourse was had to cadge teams, tug boats, fishing steamers, and in some instances a guide, canoe and supplies had to be procured for a several days' trip. No personal prospecting was attempted, and only those places were visited where the occurrence of pyrite had previously been reported, or which were brought to notice by others. Owing to defective knowledge in some sections as to what constitutes a pyrite prospect, many barren trips were taken, but only those deposits will be mentioned which may at some time possess an economic value.

Pursuant to instructions, not only the size and occurrence of the deposits were noted, but wherever possible, an examination of the ore was made to determine the quality and grade. This could not always be done, as in some instances, the available ore was in too advanced a stage of decomposition to be a fair criterion of the unaltered deposit. Country rocks were collected and carefully compared, as at the inception of the work it was thought possible that all deposits might be confined to a definite geological horizon. It can readily be seen how valuable it would be, and how much time could be saved in prospecting, if one's work could be narrowed down to special formations or certain areas. On the other hand, it was found that, speaking generally, none of our great series of formations of pre-Cambrian age is barren of pyrite occurrences in economic quantity. Nevertheless, as will be seen, outside of the Brockville and Iron Range types certain geological features and associations are common to all, and also that certain relationships are shared with deposits which have become well known in other parts of the world.

Historical

The first Iron pyrites mining in Ontario was in 1868 on Lot 19, in the second concession of Elizabethtown township, known as the Billings property, near Brockville. The mines were closed down in 1880 under the assumption that they were exhausted. The chemical works there then drew their supply of ore from across the line, until their stoppage in 1889, notwithstanding the fact that occurrences in this country were well known. See Chapman's "Minerals and Geology of Central Canada," page 75. "Large veins occur . . . in Hastings and throughout that district; as well as on the north shores of lakes Huron and Superior." "Extensive deposits are likewise seen . . . all of which are likely to become available at no distant day, in the manufacture of sulphuric acid."

In his Report on the Basin of Moose River, 1890, page 47, E. B. Borron says:

"I found, however, an apparently large body of iron pyrites on Big river, one of the tributaries of the Opazatika river. This from its purity and the amount of sulphur it contains would be valuable in some places, as great quantities of pyrites are now used in the manufacture of sulphuric acid."

Also in the report of the Royal Commission of 1890, page 56, Edward Haycock states: "Just above Cross lake on lake Temagami, I saw a great deal of mineral. I

saw a great deal of iron pyrites in deposits . . . Some of the deposits were very large. One into which I put a few blasts, I should say was five feet wide, and it has been traced a little over half a mile, all solid pyrites. There is a great quantity there in the vicinity of the lake, but it is too far from a railway."

In the same report on page 141, W. H. Wylie states:

"I also own an iron pyrites property on lot 5 in the fourth concession of Darling. It is about eight feet wide at the top and it widens out to about 10 or 12 feet at the bottom of the pit, which is now down about 35 feet." It was about nine years, however, before any further work was done on the last mentioned property

In Bureau of Mines Report, 1894, page 74, Dr. A. P. Coleman reported occurrences of iron pyrites at Nickel lake in the Rainy River District.

In Bureau of Mines Report, 1895, page 243, E. B. Borron gives the result of John Driver's exploration of "an apparently large deposit of iron pyrites" discovered by him (Borron) in the year 1886 near the river Opazatika. These results will be referred to when the northern deposits are being considered. No doubt this is the same occurrence as that mentioned by Mr. Borron in his report of 1890.

In the year 1900 in the Report of the Bureau of Mines, page 207, W. G. Miller, under the head of Pyrite states:

"Deposits of it have been developed to some extent with the object of securing a supply of the material for use in the manufacture of sulphuric acid, for which it is in considerable demand. These deposits are situated in the townships of Darling and Elizabethtown, and near Schreiber on the Canadian Pacific railway. There are no doubt numerous workable deposits in the Province: Bedford, Devil's Lake; Big River, a tributary of the Opazatika; Darling, Lot 5, Con. 4; Elizabethtown, Lot 19, Con. 2; Hungerford; Graham, Lot 12, Con. 3; Madoc, Lot 11, Con. 11; near Schreiber station on the C. P. R.; Nickel Lake, Rainy River District; Lake Temagami, Nipissing District."

Since the last-mentioned report was published, three of the above properties, namely, Hungerford; Madoc, Lot 11, Con. 11; and a deposit near lake Temagami, Nipissing District, have become shipping mines. The others have been taken up and are being held for mining or speculative purposes, except Bedford, Devil's Lake, which has not yet been located. From 1900 on, belongs the history of the working mines and the steady development of the pyrite industry throughout the Province.

In the following descriptions, the prospector's term "diorite" is used as a general term to denote intrusive greenstone, unless otherwise designated. The term "talcosc" is employed for the alteration of the schist due to vein formation, although "sericite" may in many instances be more correct. The term "fahlband" denotes a zone of pyritous schist showing the rusty stains along a definite strike. The analyses were made by A. G. Burrows, Provincial Assayer, Belleville.

The Eastern Ontario District

The oldest rock in the district is a coarsely laminated, pink granite-gneiss—biotite more frequent than hornblende—called by the older geologists the "fundamental gneiss." Upon this has been deposited various metamorphic schists, argillites, mica schists, chlorite schists, talc schists, pyroxenites, amphibolite schists, etc. The foregoing series has been cut by various basic intrusions, gabbros, diorites, anorthosites, norites, etc. These latter have in certain localities been metamorphosed to a highly developed schistose structure, and in some localities have later been invaded by finer grained eruptions probably from the same magma. Deposition now occurred of conglomerates or an autoclastic rock which has been called the Hastings or Grenville series. A long period of deposition then ensued, when limestone subsequently metamorphosed to marble, calc-schist, and sometimes to a calcareous pyroxenite, was laid down.

MANITOBA

KEEWATIN

UNGAVA

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LAKE SUPERIOR

21.

*ASHLAND

32

QUEBEC

NUMBERS refer to Pyrite Deposits in the Order mentioned in Report.

+ = ACID WORKS.

= SULPHITE PULP WORKS.

SAULT STE MARIE # STURGEON FALLS
HESKANOLA

OTTAWA

BUCHANAN
HANMER
SUPRY

LAKE MICHIGAN

LAKE HURON

GEORGIAN BAY

20

Index Map of- ONTARIO

to accompany

Report on Iron Pyrites by E. L. Fraleck

16th Report Bureau of Mines, 1907

HON. F. COCHRANE, Minister
of Lands, Forests and Mines.

YORK

*SYRACUSE

*BUFFALO

LAKE ERIE

*CLEVELAND

LAKE ONTARIO

*SCATAMON

BAY CITY

PORT HURON

DETROIT

The above formations were then invaded by granite and syenite bosses, and probably from the same magma a great series of pegmatite dikes. Diabase dikes cut all the above formations except the granite, and quartz veins a little later were quite as impartial. We now have a period of deposition, when first Potsdam sandstone, then Trenton limestone, and other members of the Silurian were formed. During the above periods several glacial epochs occurred; that at the close carving the surface of the country into its present shape, denuding it of Potsdam sandstone and Trenton limestone, except comparatively small outliers, and removing over nine-tenths of the crystalline limestone. The metamorphic sedimentaries occupy great troughs or anticlines in the older gneisses, and outliers of limestone and sandstone lie on the southern flanks of large hills along the shores of lakes and rivers, while the higher hills are composed of granite, syenite-gneiss, and the synclines of the older gneiss.

In the older gneiss, in addition to the pyrite deposits of the Brockville section, occur also working mines of mica, and where cut by pegmatites, mica and working feldspar mines.

To the schists and basic eruptives are to be assigned working mines of pyrite, copper, and where influenced by granite eruptions, gold.

The crystalline limestone possesses mines of graphite, talc, lead and zinc, and also a couple of pyrite deposits.

And to syenite intrusions we owe the working corundum mines.

The district, though in the main rocky, contains several areas of fine farming land, the remainder being used for grazing. All of it is well settled.

The Brockville Section

In 1868 John Cowan and J. B. I. Robertson began mining for pyrite on Lot 19 in the second concession of Elizabethtown township, Leeds county. (No. 1)¹. The pyrite occurred in a series of lenses conformable to the laminations of a highly foliated pink granite gneiss. A series of irregular cavities, caused probably by folding, had occurred; in these were deposited calcite and iron pyrites in parallel lines of deposition, and mining took the form of gouging out the richer shoots of ore, irrespective of any other consideration. No timbering was done, and when a part of the pit became unsafe, work at that spot was abandoned. The main pit was sunk to a depth of two hundred and fifty feet. The strike of the deposits was northeast, and the dip to the southeast. Mining operations ceased in 1879, and pyrite was obtained from the American side near DeKalb Junction. During these times the property was the scene of considerable chemical activity. In the report of the Geological Survey for 1883, page 10 L, the acid works are thus described:

"Brockville Chemical Company's mine, in the township of Brockville, has been closed since 1879. The chemical works, are, however, still in operation. The pyrite, at present used by the Company is being brought from New Hampshire at the rate of a carload a day. There are sixteen kilns in operation each having a capacity for 300 lbs. of ore. The kilns are charged every hour and produce about eighty-five carboys of sulphuric acid a day. In the distillery there are twenty-four glass retorts attached to glass receivers for redistilling the crude acid. Besides the above, about fifteen carboys of nitric and hydrochloric acids can be produced per day. In this case iron retorts and earthen receivers are used. The company employ twenty-six men."

A portion of the sulphuric acid was used at fertilizer works in Brockville. Mixed acid was supplied to two dynamite works in that neighborhood. One of these was started by C. W. Volney, the inventor of the Volney blasting powders, who afterwards sold out to one Griffin; and the other by Smith and Nelson, who were succeeded by Abbott and Harrison. Operations of all kinds ceased in 1880, and to-day not a vestige of these industries remains.

¹The numbers in brackets after mention of Iron Pyrites deposits refer to corresponding numbers showing their position on the Index Map of Ontario accompanying this Report. See page 151.

The cause of the decline and obliteration of these at one time flourishing industries was due to the prohibitive price of the raw material. To the cost of mining near DeKalb Junction must be added hauling to the railroad and loading, freight rate to Ogdensburg, unloading, loading into barges, water haulage to wharf at Brockville, unloading, loading on wagons, and hauling three miles to the acid works. This evidently could not compete with the Nichols Chemical Co.'s plant at Capelton running on a sulphur ore carrying valuable bye-products in copper and silver. In other words, Canadian and English capital turning their backs on their own country went to the States for their raw material, while American capital established itself on Canadian ore and put them out of business. The evidence of the men who worked in the old pits is to the effect that they were never completely exhausted. Be that as it may, the Brockville Chemical Company did not prove themselves very good prospectors, as a promising prospect has, in recent years, been uncovered on an adjoining lot.

The Sloan prospect (No. 2) is situated on Lot 18 in the second concession of Elizabethtown, adjoining the old Billings mine on the east. A band of gossan strikes in a northeast direction along the edge of a swamp. The disturbance that caused the vein formation is here accentuated by the intrusion of a dark green dike. On this deposit a shaft has been sunk to a depth of nineteen and a half feet. The gossan cap is from six to eight feet in depth. The shaft is on the foot wall and dips quite strongly to the southeast. The cross section of the shaft is 10 by 10 feet, and it is all in vein matter. There is a width of three feet of solid pyrites along the footwall, and the remainder is composed of alternate bands of pyrite and crystallized calcite, locally called spar:—about one-half pyrite to one-half spar. The pyrite is high grade, the only impurity being the calcite that gets intermixed in the course of mining. The method of mining consists in drilling, shooting and mucking the pyrite and calcite separately. They break from each other quite freely. As much as possible of the soft friable calcite is mined out, then the pyrite broken down, which of course is done quite readily, there being a good face to break to. Two earloads, eighty tons, were shipped to Buffalo and Capelton. The returns were forty per cent. of sulphur.

The prospect is one-half mile from the Brockville and Westport railway, and two miles from the St. Lawrence river.

On the Shipman farm about six miles to the west is another occurrence of pyrite in gneiss (No. 3). The deposit lies on the northern flank of a rocky hill about sixty feet in height. Pyrite has been mined from an irregular pit forty feet long and thirty feet wide. Small stringers leading out from this pit have been followed, making irregular surface workings to the extent of one hundred feet square. The pyrite is high grade, but very much intermixed with pyrrhotite and country rock. The prospect is one-half mile from the Grand Trunk railway and one mile from the St. Lawrence river.

McIlwraith Mine

This property (No. 4) is situated on Lot 5 in the fourth concession of the township of Darling, Lanark county. The vein strikes slightly north of east along a contact between diorite on the south and crystalline limestone on the north. It was first opened up many years ago by W. H. Wylie of Almonte and Wm. Hall of Darling when prospecting for gold. They sank a shaft to a depth of thirty-five feet. The Nichols Chemical Company instituted mining operations under an option in September, 1899. The old shaft was deepened to seventy-five feet and from the bottom a drift run eight feet to the east. A tunnel, one hundred and fifty feet long, with an outside approach of fifty feet was driven along the strike of the vein. This discloses a length of over ninety feet of workable ore, clean high grade pyrite enclosing lenses of quartz. A cross cut of twelve feet to the south failed to pierce the width of the deposit. The lens dips to the south at an angle of 60°, and pitches to the east away from the shaft which pierced the lens, which it is claimed was caught again by the drift. Work ceased at the expiration

of the option, the end of April 1900. Three carloads were shipped away and the mining was all done by hand. The gossan cap is fourteen feet deep.

In a line of weakness caused by the contact of the diorite with the crystalline limestone, pyrite-bearing solutions have eaten out cavities and lenses in the limestone, depositing in them pyrite and quartz. These break quite free from each other, and the only impurity in the pyrite is small intermixed particles of quartz. Allowing for reasonable culling, an average sample from the tunnel assayed by A. G. Burrows, yielded 42.60 per cent. of sulphur, and a sample from a dump of three hundred tons removed from the property to an adjoining lot, and which had been exposed to weather for six years, yielded 38.86 per cent. of sulphur.

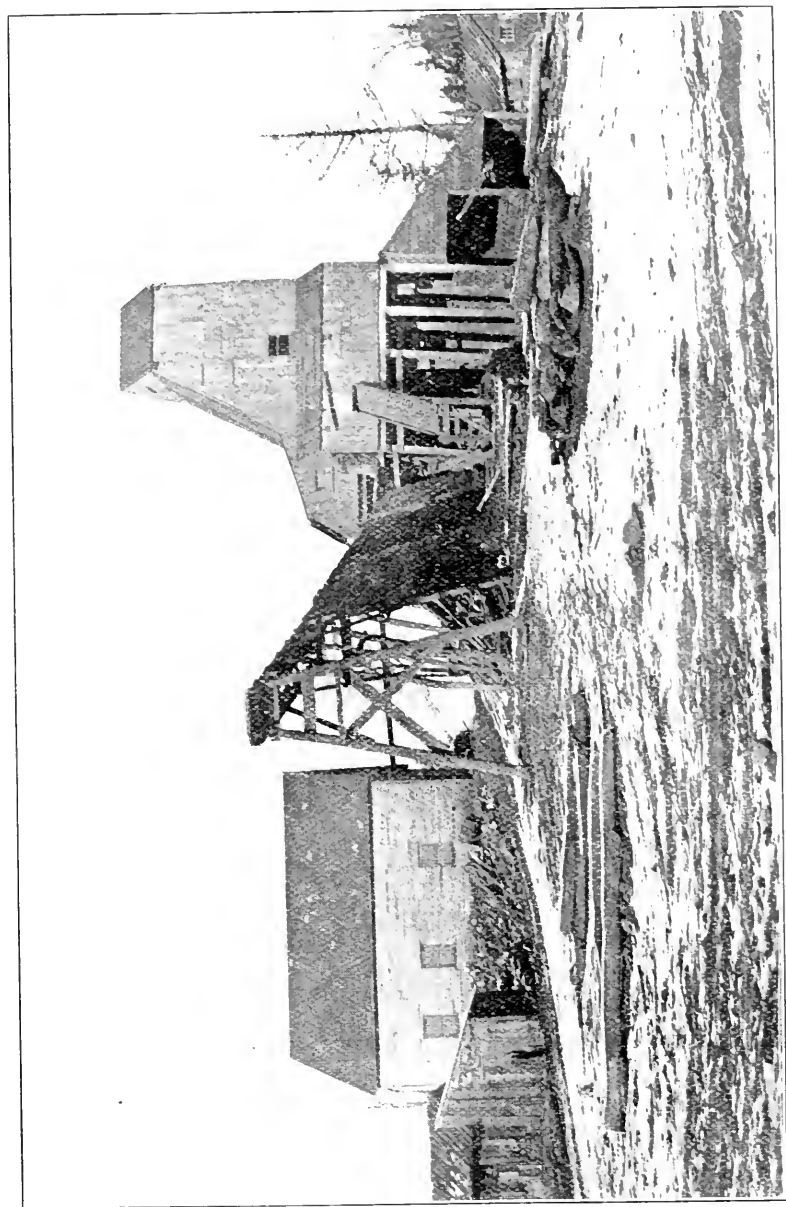
The property is ten miles by winter haul from Clyde Forks on the Kingston and Pembroke railway.



Dump at McIlwraith mine, Darling township.

Bannockburn Pyrite Mine

The Bannockburn pyrite mine (No. 5) is situated on Lot 25 in the sixth concession of the township of Madoc, Hastings county, about one mile southeast of the village of Bannockburn. In 1898 openings were made for iron ore, and Stephen Wellington of Madoc shipped eleven carloads of bog iron ore or limonite to the Hamilton Iron and Steel Company. This ore, which ran upwards of 38 per cent. metallic iron and low in sulphur, was merely the gossan capping of iron pyrites deposits. These were further prospected by Thomas Burnside and Wm. Coe of Cleveland. In the summer of 1900, they transferred their lease to the American Madoc Mining Company, who abandoned operations at the McIlwraith in favor of the more accessible deposit. The gossan capping at the Bannockburn mine varied in depth from eight to fifteen feet. A pit about eighty feet in diameter and ninety feet deep was sunk, but at this stage had to be abandoned. Through the oxidation of low grade ore, large masses began to scale off the sides of the pit, necessitating either an expensive system of square set timbering or



Bamockburn mine, showing power house, head frame and rock house.

cessation of the work. In the meantime a new lens had been opened up about five hundred feet south of the open pit. A shaft was here sunk, levels run every sixty feet, overhand stoping adopted and a skipway with guard rail provided. A battery of boilers and a five-drill straight-line air compressor were installed, which supplied the drills, steam being used for the pumps. In later years this method of working was abandoned for the following practice. Eight or ten feet was sunk, followed by underhand stoping back the full length of the lens. For convenience in mucking the skip was replaced by a bucket. The lens pitching to the north and the shaft having pierced it also rendered the operation of a skip impossible. The skids at the top of the rock house were inclined to the horizontal. As the loaded bucket was hoisted into this position a chain was hooked into a ring in the bottom, enabling the bucket to dump as it was lowered slightly, the skids being pulled apart. The chain was unhooked as the bucket was hoisted, it was then thrown back on the skids and lowered. Each bucket dumped its load on steel



Bannockburn mine, showing tripods at the open pit.

bars, six inches apart set above a series of grizzlies spaced to one-half inch. The fines from the grizzlies discharged through the rock house floor, and the culled lump ore was wheeled out to a loading dock, whence wagons drew it a half mile to the siding on the Central Ontario railway.

Some shipments from the open pit graded from 46 to 48 per cent of sulphur, and some from the south lens did not run higher than 37 per cent. A fair average of the property would be 40 per cent. of sulphur. The ore is hard and makes very little fines.

The country rock is a chlorite schist, showing talcose or micaceous alteration in the vicinity of the ore bodies. The south lens and enclosing schist strike slightly west of north until west of the open pit, when a fold of an angle of 90° turns the strike to a little north of east. The south lens dips with the country to the east, and the open pit in a similar manner to the south. Unfortunately, the surface of the schist at the apex of the fold is covered by a deposit of limestone subsequently metamorphosed to

calc schist, but there is no evidence whatsoever of faulting. Folding, whether of a simple nature or a pitched anticlinal subsequently eroded, produced the lines of weakness through which the pyrite bearing solutions seeped, the deposits being formed by replacement. The ore comes readily off a fairly good foot wall, but gets lower and lower in grade on the other side, shading away gradually into the schist. It is impossible to obtain fresh specimens of the schist. It is probably of a hornblende type originally; the chloritic alteration being due to surface weathering and the influence of vein formation. The south lens is one hundred and sixty feet in length, and varied from eight to fifteen feet in width. The mine employed from thirty-five to forty men and shipped during its six years of operation about five hundred and eighty tons per month; all of which went to the General Chemical Company at Buffalo.

Although the ore fell off neither in grade or quantity with depth, yet on account of the open method of mining, (the south lens being stoped out to a depth of 275 feet), and the tendency of the walls to scale, mining became so hazardous that operations were abandoned in August 1906.

The Hungerford Fahlbänd

The Hungerford fahlbänd lies about five miles east of the village of Tweed north of the Canadian Pacific railway. It strikes north 65° east, and is easily traceable for two miles. Level farm land to the south is underlain by garnetiferous crystalline schist cut by massive diorite, into which, five hundred yards north of the deposits, has intruded a pink hornblende granite that rises above the country in a series of rugged hills (locally called the Bald mountains), and has protected the deposit from denudation. The deposits are strung along the contact of the diorite and the schist, the strike of the lenses, the contact, the fahlbänd, and the schist being identical.

Hungerford Mine

The Hungerford mine (No. 6) situated on Lot 23 in the twelfth concession of the township of Hungerford, Hastings county, was opened up thirty years ago as a gold property, and a smelter was erected to extract gold from the barren pyrite.

The present operators, the American Madoc Mining Company, (now Canada Nichols Chemical Company) re-opened the mine in June 1903. Owing to some difficulty about the title, the mine was closed down in August 1904, but operations were resumed in August 1905, and have since been continuous.

A shaft with cross section 14 by 8 feet has been sunk on the diorite foot wall to a depth of three hundred feet, and levels run every hundred feet. On each level cross cuts have also been made to catch the middle and north veins. The shaft dips to the south at an angle of 59° to 61° at the bottom.

The south vein, on which the shaft is located, has been exploited to a length of 150 feet.

The middle vein, which was a pleasant surprise when struck, as there is no visible outcrop on the surface, is eighty feet to the north of the south vein, and has been explored to a length of eighty-five feet. This vein has on the first level a width of about six feet of high grade ore, but on the second level contains a very large quantity of calcite.

Forty-five feet farther to the north the north vein was encountered. This vein when cut was twenty-two feet wide, seventeen feet representing massive pyrite. The length of the drift on this vein is 380 feet, and the ore still continues; the length as indicated on the surface being about 500 feet. The width varies from six to twenty-two feet. The mine is practically a dry one, very little water being encountered except that from surface seepage which is trapped on the first level.

The ore is coarsely granular and makes a large percentage of fines. The main impurity is calcite, very little quartz being present. A small quantity of pyrrhotite occasionally occurs, mainly in the north vein.

The power plant consists of an 80-h.p. return tubular boiler, and a straight line, Ingersoll-Sergeant air compressor, with 14½ by 16-in. cylinder. These, with an 8½ by 10 Lidgerwood hoist, are housed in a building forty-five feet square. The other buildings consist of a blacksmith shop, men's dry, coal bin, office, store room, stables, etc.

The head frame, one of the very neatest in the Province, consists of four legs of 12 by 12 timbering, six sixty feet in height, and so designed that the resultant of the cable stresses each side of the sheave pierces the ground at the intersection of the diagonals of the base, thereby throwing an equal strain on each leg.

The ore is raised by a skip, and is dumped on two sets of grizzlies spaced two and one-half and one-half inch; yielding three products, lump, spalls and fines. The larger lumps of the over size are broken by men with hammers, a certain amount of culling being done at the same time. All ore shipped has been sent to the plant at the General Chemical Company at Buffalo. An acid works, however, is now being erected on the



Nichols Chemical Company's pyrite mine, Sulphide.

property by the Nichols Chemical Company at Sulphide station. The lump ore will grade from 42 to 44 per cent. sulphur, the fines of course much lower.

The Canadian Pacific railway crosses the southern end of the property about five hundred yards distant.

The systematic development of this mine reflects the greatest credit upon the engineering ability of the late A. W. Rising, the superintendent up to the time of his death in the fall of 1906.

Oliver Prospect

The Oliver prospect (No. 7) is situated along the same fahlband on Lot 26 in the twelfth concession of Hungerford township. A lead of gossan is traceable across this lot along the side of a depression. The property is being prospected by means of New York capital, and a shaft, which has attained a depth of twenty feet, is being sunk

on a vein averaging from four to seven feet. The ore on the dump, pyrite with a little calcite and pyrrhotite, will grade upwards of 40 per cent. in sulphur.

The prospect lies about 125 yards north of the Canadian Pacific railway.

W. A. Hungerford of Madoc is superintendent in charge.

Hungerford Western Extension

The Hungerford Western Extension (No. 8) comprises lots twenty-one and twenty-two in the twelfth concession of Hungerford township. This property has been fairly well prospected by means of surface trenches at regular intervals along the strike of the fahlband.

The western lens has been exploited by surface trenches to a length of five hundred feet, and exhibits, in the trenches near the line between the lots, a width varying from



The Oliver prospect.

sixteen or eighteen feet of ore, which will grade from forty-two to forty-four per cent. of sulphur. The only impurity consists of small included lenses of calcite.

The eastern lenses have not been prospected, but are presumably continuations of the Hungerford mine ore bodies.

Pyrite has also been located to the south near the railway. The gossan is about forty feet wide, but not enough work has been done to determine the extent of the pyrite.

The Canadian Pacific railway crosses the southern end of the property, about three hundred yards distant.

At certain points along the zone of weakness as denoted by the contact, cracks and lines of superior permeability have been induced, thus producing conditions favorable to the circulation of ore-bearing solutions and the deposition of the pyrite. The diorite

shows no pyrite, but the schist is considerably impregnated here and there for a distance of over two miles. The intrusion of the granite has no connection with the ore bodies, except probably to accentuate the planes of weakness.

The Queensboro Fahlband

This fahlband, which is near the eastern boundary of Madoc township, strikes in a general north-of-east direction, and can be readily followed for a distance of two miles, stained, rusty and decomposed schists being discernible throughout that distance.

Queensboro Mine

The Queensboro pyrite mine (No. 9) is situated on lot eleven in the eleventh concession of Madoc township, Hastings county, about one mile southwest of the village of Queensboro, and one-half mile west of the Bay of Quinte railway.



Open cut, Queensboro mine.

The deposit lies in a depression at the contact of a garnetiferous crystalline schist to the south, resembling that at Hungerford, and an intrusion of light gray granite to the north.

A small spring creek ran through the depression over a part of the deposit. This it was necessary to divert, and a shaft has been sunk, at the edge of the old creek bed, to a depth of eighty-five feet. At fifty feet in depth water came in to such an extent that a drift was driven to the east for thirty feet and a cistern constructed into which by means of wall plates and troughs, the water was trapped. At the bottom of the shaft a drift has been run to the west for twenty-five feet, and a cross cut made twenty feet to the north. At the present time work in this shaft consists of drifting to the west from the fifty-foot level.

One hundred and fifty feet to the west another shaft has been sunk to a depth of thirty feet.

About one hundred feet southwest of the main shaft a zone of highly pyritous rock is being worked. Through this run several lenses up to four or five feet thick of medium grade pyrite shading off into leaner ore. One lens contains disseminated copper pyrites. This is being worked by an open pit.

The mine is operated by the British American Development Company of Toronto.

The plant consists of two boilers, one 65-h.p. and one 50-h.p., both locomotive type and asbestos covered; also one McEwan Drill Co. of N. Y. four-drill, straight-line air compressor with cylinder 12 by 18 inches, and one steam hoist 10 by 12 inches. There are likewise blacksmith shop, storehouse, office building, etc.

The pumps comprise one Knowles with 6-inch suction and 5-inch discharge and two vertical plunger Camerons 2½ by 2 and 3 by 2½ respectively.

The pyrite is hauled by teams to Queensboro station and there shipped to the Contact Process Company at Buffalo. The first twenty-one cars shipped averaged forty-seven per cent. of sulphur, and shipments up to the fall of 1906 amounted to sixty-five carloads.

The highest grade ore comes from a series of lenses close to the granite contact. That on which the main shaft is sunk has at the shaft a width of fifteen feet and a length of about fifty feet, thinning out towards the ends. To the west is a similar lens, as yet undeveloped, which shows a width in a surface trench of twenty feet of very high grade pyrite. The iron pyrites in these lenses is a hard, heavy, dense ore resembling a massive magnetite, the only impurity being thin veinlets of quartz. To the south is an extensive area of more or less imperfect impregnation, yielding places from which a thirty-five per cent. sulphur ore can be quarried.

A noteworthy feature at this deposit is a small vein to the west of the workings which has a northwest strike and is about two feet wide. It has been opened by a trench sixteen feet long and four feet deep. It cuts the formation at an angle of 45° and appears to possess well defined walls. The vein is composed of quartz, pyrite, copper pyrite and argentiferous jamesonite. This vein is of later age than the pyrite deposit. The jamesonite fills the interstices and is formed around crystals of pyrite. This vein possesses an interest on account of the rare occurrence of jamesonite in this country, and the present high price of antimony.

Wellington Prospect

The Wellington prospect (No. 10) is situated on the north half of lot nine in the tenth concession of the township of Madoc. A series of pits and trenches have disclosed a belt of gossan over five hundred feet long, two hundred feet wide and about twelve feet in depth. The gossan is mainly conglomerate with iron oxide as a cementing material. Certain portions however are a fairly fine limonite. Here and there throughout this material are found boulders of high grade pyrite up to twelve inches in diameter. Although the outside of these is oxidized, the angular outline is still discernible. Prospecting has as yet failed to reveal the parent ledge.

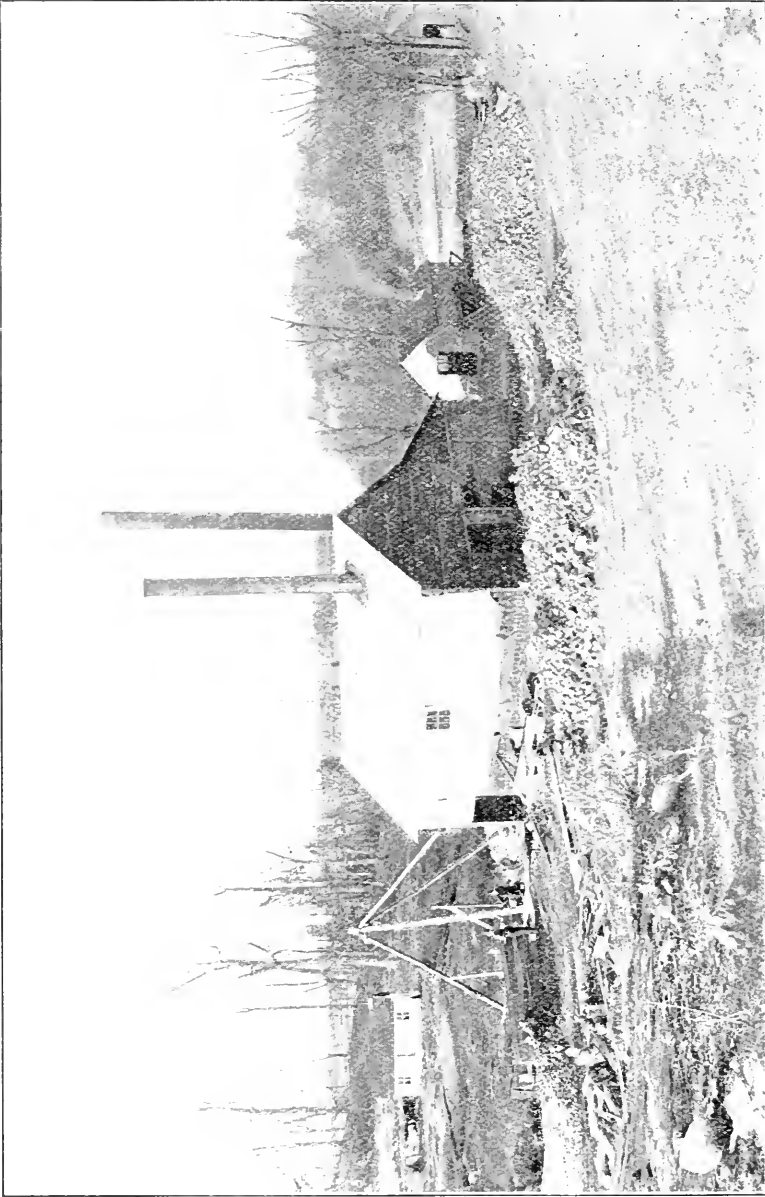
Davis Prospect

The Davis prospect (No. 11) corners on the Wellington to the northwest. A test pit about ten feet deep has been sunk on pyrite somewhat intermixed with crystalline limestone. At another point on the same lot a heavy band of gossan is being prospected.

The Farrell Prospect

The Farrell prospect (No. 12) is situated on the Farrell farm about two miles north-east of Madoc village, Hastings county.

The country rock of the deposit is a calc schist with a northwest strike to which the deposit conforms. Test pits for a distance of two hundred feet show either gossan



Power house, Queensboro mine; shaft with tripod at left.

or pyrite. A shaft has been sunk to a depth of about twenty-five feet. About forty tons of ore lie on the dump. A sample representing an average of seventy-five per cent. of this material yielded 40.64 per cent. of sulphur. The deposit maintains a uniform width of five feet. The only impurity in the ore is crystalline limestone.

McKenty Prospect

The McKenty prospect (No. 13) lies on the McKenty farm at Mullet's Corners, two miles east of the village of Madoc. Hematite was shipped from this property thirty years ago, and desultory iron mining has been carried on ever since.

A pit at one time sixty feet deep has caved in. An examination of the cull dump reveals the fact that all large lumps of apparent hematite have, when broken, a core of pyrite. In the writer's opinion, this is one of many instances throughout Eastern Ontario where hematite constitutes the gossan capping of a sulphide ore body.

An interesting feature is a talus breccia to the south of the deposit, composed of sharp angular fragments of hematite cemented with a sandstone bond.

Deposits in Cashel

The Little Salmon Lake deposit (No. 14) is located on the shore of Little Salmon lake on lot twenty-three in the seventh concession of the township of Cashel, Hastings county.

A hill rises sharply above the level of the lake to a height of eighty feet. Half way up the hill a trench forty feet long has exposed a deposit of pyrites. In the north end of the trench, the pyrite uncovered is fifteen feet wide. An average of seventy-five per cent. of the pyritous material yielded 38.83 per cent. of sulphur. The country rock of the deposit is a chlorite schist and the strike is east and west.

The Central Ontario railway is nine miles distant by winter draw at Gilmour, and six miles winter draw across Big Salmon lake to the gravel pit.

The Gunter property (No. 15) is situated on lot twenty-three in the fourth concession of Cashel.

A shaft has been sunk on the lead to a depth of twenty feet in alternate bands of quartz and pyrite. The work was done while prospecting for gold. The soil on the surface is quite unaltered, and no gossan, fahlband or other indications of a pyrite deposit are visible. The pyrites in the shaft, however, uniformly increased with depth. A sample representing two-thirds of the dump yielded 39.50 per cent. of sulphur. The total width of the vein is five feet.

The Central Ontario railway is seven miles distant by summer road and six miles by winter haul.

Other Eastern Ontario Prospects

The Snooks prospect (No. 16) is on lot seven in the fourteenth concession of the township of Loughborough, Frontenac county.

A fahlband strikes northeast through a coarse, impure crystalline limestone. At the only opening massive pyrite shows to a width of seven feet, and, mixed with crystalline limestone, to a width of twenty-five feet. This is on the road allowance and was uncovered in obtaining material for the road. The fahlband can be easily traced across lot six in the fourteenth concession to the shore of Desert lake.

It is nine miles distant by rough wagon road to Hartington on the Kingston and Pembroke railway.

Ladore Prospect

The Ladore prospect (No. 17) comprises a portion of the east half of lot nineteen in the seventh concession of the township of Dalhousie, Lanark county.

A heavy fahlband strikes north of east along the contact of a coarse amphibolite and a fine grained gray granite. Nearly every trench in the marshes and depressions

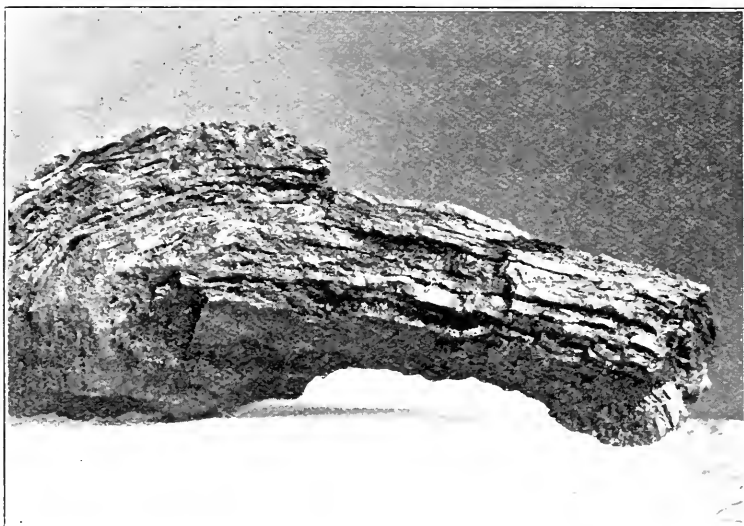
exposes gossan in the form of a good grade of bog iron ore. Two pits one hundred yards apart have been sunk to a depth of twenty and twenty-two feet respectively, in gossan and decomposed rock matter. The south pit is noticeable for quantities of delicate cellular silica. Outside of seams up to a foot in thickness, pyrite in quantity has not yet been located.

The same tahlband continues across lot nineteen in the sixth concession, along a contact of crystalline limestone and granite. Here are a series of interesting caverns in the limestone, which have been caused by solvent action of acid solutions, followed by deposition of pyrite in the cavities and subsequent oxidation.

The property is seven miles winter draw from Wilbur siding on the Kingston and Pembroke railway, and is being prospected by Wellington and Henderson of Madoc.

The Stalker Prospect

This prospect (No. 18) is situated on lot forty-two in the sixth concession of the township of Clarendon, Frontenac county, about two miles east of the village of Plevna.



Laminated limonite (Ladore).

A well defined fahlband strikes in an east and west direction. A small test pit has been sunk on a lens of pyrite which shows at that point a width of six feet. A quartz vein one foot in width lies along a hanging wall of clay slate, the foot wall consisting of crystalline limestone. A six-foot depth of gossan shades into hematite as the fahlband crosses on lot forty-two in the fifth concession.

This prospect is referred to by W. G. Miller in the Eleventh Report of the Bureau of Mines, 1902, page 203, as follows: "A deposit of iron pyrites has been opened up on one of these lots. Although the deposit is of a promising character, it is apparently too far from the railroad to be worked profitably at present."

The Foley Prospect

This property (No. 19) is situated five and one-half miles by fair wagon road, north from Enterprise station on the Bay of Quinte railway. The work consists of a pit eighty feet long, forty feet wide, and ten to fifteen feet deep, sunk on pyrite and pyrrhotite in about equal proportions, intermixed with pyroxene, calcite, mica, and molybdenite. A sample treated at the laboratory of the Kingston School of Mines was

successfully separated by combined washing and magnetic concentration. As an economic proposition, however, mining costs, separating costs, condition of markets, costs of transportation, etc., have to be considered. The pyrite consists of small masses in the rock and pyrrhotite, and the deposit is irregular. The occurrence is in an outlier of crystalline limestone surrounded on all sides at short distances by granite.

The Harris Mine

This mine (No 20) is located on the shore of James lake, about three-quarters of a mile west of the Temiskaming and Northern Ontario railway, at the eighty-third mile post.

The discovery was made in 1903, but active development was not instituted until December 1906.

A shaft has been sunk to a depth of seventy feet with a drift on the vein of forty feet to the south and twenty to the north. A test pit twenty feet deep has been sunk on another lens about forty feet northeast of the main shaft.

Another lens was being opened up by an open pit about two hundred and fifty feet to the southeast of the shaft. This showed a width of over twelve feet of solid pyrite. Three lenses have been located in a pyritous zone, four hundred and ten feet in length. The fahlband is fairly strong and traceable for a quarter of a mile.

The mine equipment consisted of one 50-h.p. boiler, locomotive type, one Lidgerwood hoist 8½ by 10, and one four-drill, straight-line Ingersoll-Sergeant air compressor with four hundred and two cubic feet of free air per minute capacity. The shaft is fairly dry and equipped with a Cameron sinking pump, 2½-inch suction and 1½-inch discharge.

Hoisting is done by bucket with an ingenious bucket tripping device, which will be described later. The shaft on the deposit dips with the schist 70° to the west.

The lens lies in a soft green schist about one hundred feet east of the contact with a gray hornblende granite. The intrusion of the granite has caused planes of weakness and fracture in the schist, subsequently filled by pyrite.

The only impurity in the ore consists of small veinlets of quartz and massive pyrrhotite on each wall of the lenses. Occasionally pyrrhotite is also finely disseminated through the pyrite. The ore breaks nicely, making very little fines in the course of mining. Shipments up to 1 July 1906, were 220 tons averaging 42 per cent in sulphur. All ore goes to the General Chemical Company of Buffalo.

A force of sixteen men was employed at the mine with Mr. Ronald Harris, engineer in charge.

Helen Iron Mine Pyrite Deposits

The Helen iron mine (No. 21) has been described in several Reports of the Bureau of Mines, *i. e.* by A. P. Coleman in 1900 and 1901, and in a thorough and detailed account of the mine and Michipicoten Iron Range in the Report for 1902 by Messrs. Coleman and Willmott.²

As, however, the existence of pyrites in large quantity has only been revealed by the underground work of the past two years, the reports deal almost wholly with the occurrence of the iron ore.

Roughly, the pyrite and hematite deposits may be said to lie in the arena of a vast elliptical rock-rimmed amphitheatre bounded on the east by a large steep hill of iron carbonate, on the north by cherty carbonate and quartz-porphry schist, on the south by quartz-porphry schist, and on the west by pyritous and cherty iron carbonates. The several series of rocks are interbedded and stand almost vertical.

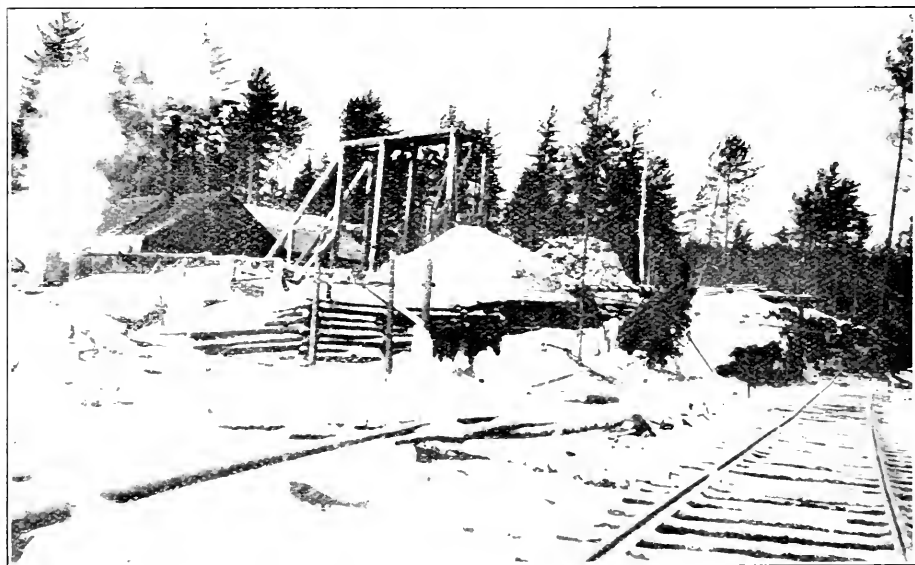
Pyrite in Iron Ore

The Helen iron mine occupies the eastern end of this great pit-like depression. The ore body, as evidenced in the second level of the workings, is in the form of an ellipse

² Also by A. B. Willmott, *Am. Geol.*, Vol. XXVII., No. 1, July, 1901, pp. 14-19.



Harris mine, Rib lake.



Harris mine, Rib lake, showing railway spur.

with an east and west axis, five hundred feet in length by a width of three hundred feet. The occurrence of pyrite intimately associated with this large body of brown hematite presents certain features differing from any other pyrite property examined. The pyrite as encountered near the surface is described in the Eleventh Report of the Bureau of Mines, 1902, page 170, as follows:

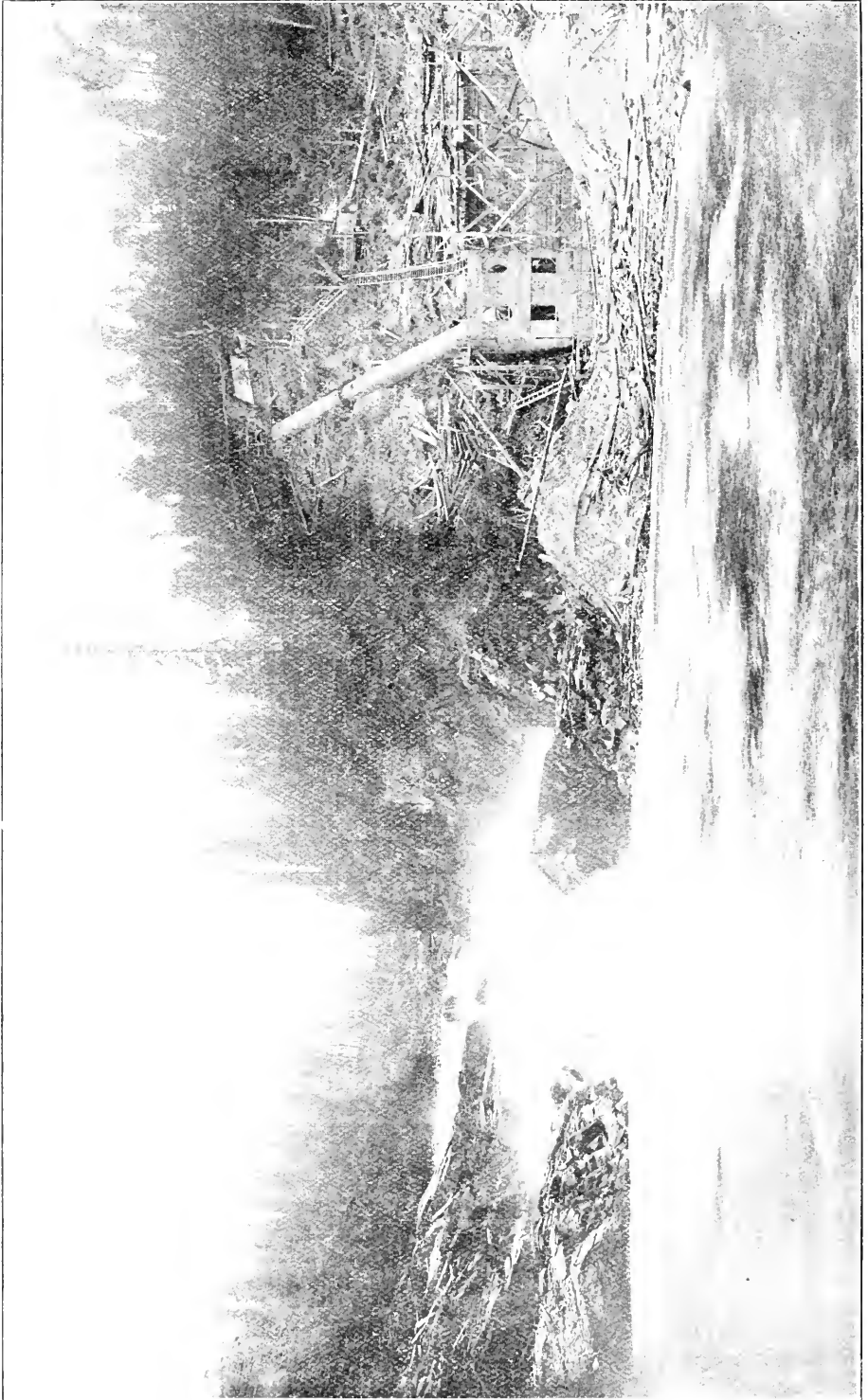
"At points in the ore body, pockets of pyritic sand are occasionally met. The largest of these, which was exposed during an examination of the Helen mine last May, as seen in the bottom of the pit, was forty-five feet by eight feet, but was probably wider. At both ends, however, it was cut off very abruptly by the ore body, there being no gradation between the solid ore and the pyritic sand. Occasionally in this bed, some boulders of solid ore were noticed, the largest being two feet in diameter. Little stringers of pure white fine sand were occasionally seen in the pyrites, but apart from these minor occurrences, the pyritic sand seemed to be a pure concentrate. It is said that on the surface this deposit first made its appearance as a chimney¹ of sand about thirty feet in diameter, and that as followed down the siliceous sand was gradually replaced by pyritic sand until the present level was reached, and that the pyritic sand has been replaced in the bottom with solid ore just as abruptly as it changed on the sides."

From such a small beginning the pyrite has steadily increased with depth. At the first level, *i. e.* the depth of the bottom of the old pit, the amount is not very considerable, but on the second level the pyrite shoots or lenses assume something of a definite character. The hematite ore body is here found to be enclosed by a vast crescent-shaped deposit of pyrite. It is bounded on the east, north and west by this material, the south only having a rock contact. There are also throughout the iron deposit, large pyrite lenses with a strike parallel to the longer axis of the elliptical hematite ore body. The base of the iron pyrites deposits is found to have broadened with the opening up of each successive level. Although certain isolated pockets of pyrites are occasionally met with, the main shoots are sufficiently well defined to enable their location to be predicated on future levels, and the workings (especially the main gangways) directed so as to escape them. Although the fragile looking hematite is very cohesive, in mining such a large ore body pillars have to be left as supports. The mode of occurrence of the iron pyrites is skilfully taken advantage of, and the pillars consist almost entirely of pyrite enclosed in a shell of hematite. Although the work is laid out with this object in view, these pillars are frequently broken into, in order that no chances may be taken as to their real character. Notwithstanding the increase of the amount of pyrite, the hematite is not suffering appreciable diminution, as the base of the whole ore body seems to be broadening with depth. The pyrite however is increasing at a much faster rate and a horizontal cross section at the second level would reveal a pyrite area almost if not quite equal in extent to the iron ore. Although the third level has been only partially developed, the pyrite shoot disclosed by the workings appears to have a much larger area than it occupies on the level above.

Pyritic Sand

Another extraordinary feature in connection with this mine is the fact that the pyrite consists almost entirely of fines. Lumps of hard ore are occasionally met with, but the remainder is in a fine granular condition resembling very clean concentrates. A haphazard sample taken at a point in the second level resulted in 50.96 per cent. of sulphur, the impurity being silica. This is probably a little higher than the average, as shipments from the mine have graded from 45 to 46 per cent. sulphur, but these, owing to contamination by hematite, *i. e.* in the mine tramcars, skip, surface cars, chutes, etc., run somewhat lower than the clean ore. It is safe to say, that in mining for pyrite alone and all due precaution being taken, the material would grade between 46 and 48 per cent. of sulphur.

The pyrite in these lenses possessing a fine saccharoidal structure, and being closely confined by the hematite, exhibits the quality of flowing like hot dry sand at any point where the pressure is relieved. The horizontal flow at these points in a similar



Michipicoten Power Company, High falls, Michipicoten river, showing power house and penstock.

manner to water or grain in the bin of an elevator is the direct equivalent of the downward pressure of the superincumbent material. Therefore, if an opening happens to be made in one of the lenses prompt measures are at once taken to timber against the pyrite, preventing it from invading the mine workings. Owing to the smallness of the opening this is usually effected without much difficulty, but on at least two occasions the pressure was too strong for any ordinary means of resistance. In drifting on the third level one of these lenses of pyrite was encountered, and an endeavour made to drive through it. Ordinary timbering was of no avail; even the largest posts buckling under the immense load. A measure of success, however, was achieved by using large posts—sixteen inches in diameter and upwards—set almost skin to skin with similar caps, set in place by the aid of powerful jacks. This provided for the pressure, but the inrush of pyrite at the face was so great—evinced no diminution, regardless of the amount removed—that the project had to be abandoned, and the level laid out in a manner to avoid the pyrite.

Boyer Lake Deposit

The Boyer lake pyrite deposit is thus referred to by W. G. Miller in the Twelfth Report of the Bureau of Mines, 1903, page 103:

"The diamond drill now operating in Boyer lake has penetrated 100 feet of what is said to be a very clean iron pyrites. This is to the west of the mine proper. . . . All the pyrite is in a large body similar in consistency to a sand pile. . . . The pyrite is overlain with 40 feet of mud and 20 feet of intermixed pyrite and sand."

The diamond drill holes were put down through an area of one hundred by two hundred feet and disclosed pyrite to the depth, they were drilled, *i. e.*, 125 feet for the deepest. That similar masses in the Helen mine about one hundred yards east have increased in size with depth encourages the expectation that this deposit may be relied upon down to the same level as the bottom of the mine workings at least.

Pyrite at Sayer Lake

At the head of Sayer lake a small tunnel about forty feet in length has been driven in a hill just at the water's edge. The material is iron carbonate interbanded with pyrite. About one-quarter of the formation penetrated by the tunnel appeared to be pyrite. A sample from the dump (discarding all pieces absolutely barren) yielded 32.80 per cent. of sulphur. This formation runs along the shore to the north, pyrite outcropping at a distance of four hundred feet. The trench between Boyer and Sayer lakes cuts through an extension, the interbanded pyrite and carbonate here being fifteen feet in width. Some of these bands of pyrite are several feet in thickness. An average sample of these yielded 31.70 per cent. of sulphur.

To the north of Sayer lake a side cut for the railway has exposed interbanded chert and carbonate, pyrite and graphitic shale. The pyrite varied from half an inch up to a foot in thickness. Rapid oxidation is here going on, and the action of the decomposing pyrite and sulphate on the carbonate can be observed on the streaked and stained portions of the side of the hill. The whole range is about three hundred feet in width.

Considering the topography and the number of pyrite occurrences, there is some reason for believing that pyrite may be found under the little acid pond constituting all that is left of Boyer lake.

Not taking into consideration, however, probable ore or possible ore, 500,000 tons of high grade pyrite is not too high an estimate of ore in sight and disclosed by diamond drilling at and near the Helen iron mine.

Mention may be made here of a deposit of yellow ochre which covers the western portion of the Helen ore body. No work has been done on it, but a large amount of material is visible. Ries in "Economic Geology of the United States," page 187, states: "Ochres are classified according to shade of color, thus: yellow ochre is colored by hydrous iron oxide; red ochre owes its color to ferric oxide, and hence can be produced

by roasting yellow ochre." He gives the imports of ochres into the United States in 1903, as 9,960,334 pounds valued at \$100,447, France being the largest producer. The Mining World of Chicago states that yellow ochre is largely used in the linoleum industry, the quotations ranging from nine to sixteen dollars per ton. Simple screening, or grinding and screening, would be necessary to render the raw ochre marketable.

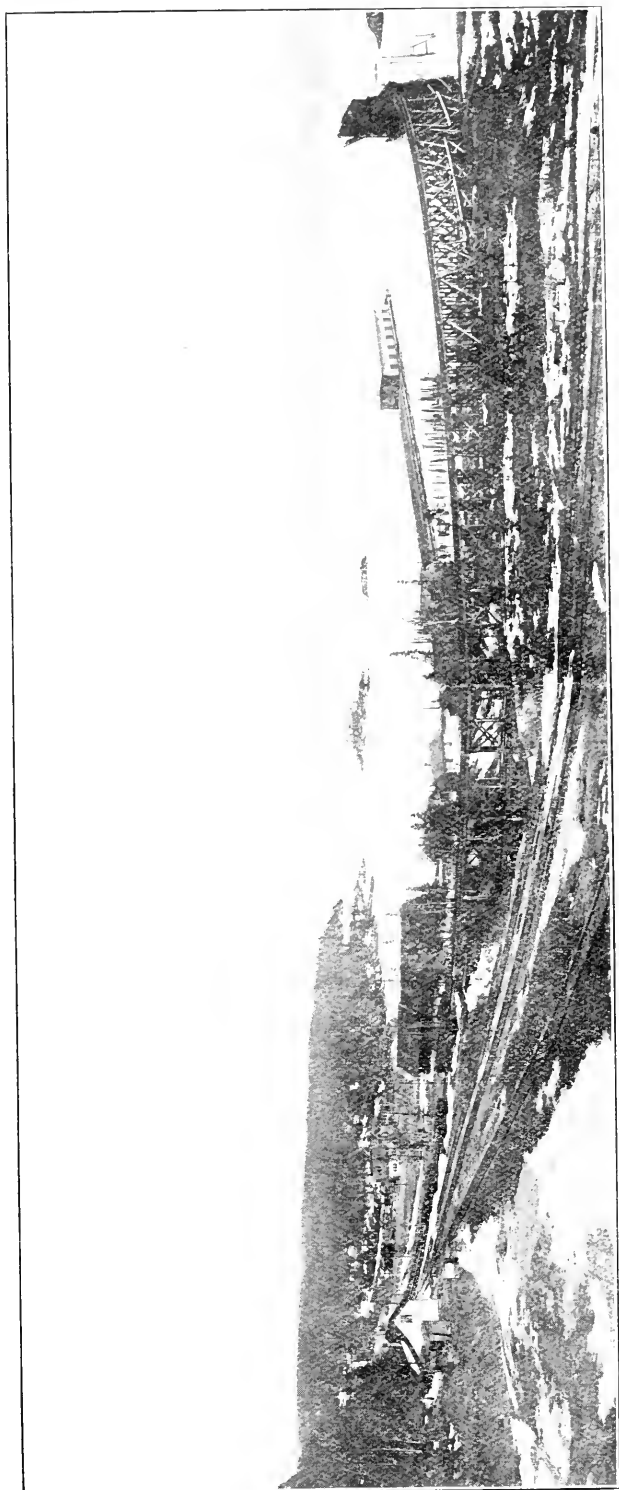
By the work of Messrs. Coleman and Willmott, referred to above, it has been shown that the Boyer lake depression has resulted from the folding and tilting of the underlying schists, followed by brecciation and denudation and the subsequent action of solvents.

Origin of the Pyrite

The Helen ore body has evidently resulted from the action of oxidizing conditions upon material in place. There are reasons for believing that this material was wholly composed neither of iron carbonate nor iron pyrites. The theory that the deposit as originally laid down consisted entirely of carbonate compels the assumption of vast cavities, *i. e.* at least three hundred feet in depth—equal to one-half of the whole ore body, and a concentration of pyrite fines in these cavities, as clean as mechanical means would effect. An enormous mass of finely disseminated pyrites, close at hand in a material more soluble than the grains of pyrite would also have to be assumed. On the other hand, if the whole ore body at one time consisted of iron pyrites only, it would now, except for difference of local conditions, resemble an ordinary pyrite mine.

If, however, the deposit originally consisted of a series of very high grade pyrite lenses lying in a formation of pyritous carbonate, oxidation would proceed in the following manner: The surface of the pyrite and the pyrite in the carbonate would be oxidized to ferric sulphate. This would immediately react upon the unchanged pyrite and the carbonate, being itself reduced to ferrous sulphate, and this in turn would be changed to the hydrous oxide with the setting free of sulphuric acid, which would at once begin anew the cycle of oxidation. Now, when iron carbonate is altered to limonite there is a shrinkage of fully 20 per cent. The resultant iron ore would therefore possess a very open, porous texture, and this is characteristic of the Helen ore. Also, at portions of the deposit, surface waters having passed over partly changed pyrite and dissolving the sulphates, would accumulate and seep through the underlying pyritous carbonate, the sulphate and acid in solution carrying on the cycle of change. This process would go on as far as surface waters could penetrate the loosely textured iron ore, and a purification in regard to sulphur content would ensue down to the present day.

Under ordinary conditions, the higher grade the pyrite, the faster and more thoroughly it will oxidize, but there is one case at least where the opposite of this is true, and the higher grade the pyrite the more effectually it will protect itself from weathering influences. Several examples were met with, where a pyrite deposit presented an inclined surface with good drainage. In these instances, layers of finely laminated limonite form over the surface of the pyrite, protecting it from seepage and other oxidizing influences. This is found to be the case with the pyrite lenses at the Helen mine. The water seeping and percolating as shown, found an obstacle in dense massive pyrite, the outside of which only was converted into an impervious schistose layer of limonite, which prevented any further oxidation. The miners are able to take advantage of this, being warned from the structure of the iron ore of the proximity of pyrite, the shell or casing conforming to its outline. The laminated ore, which is from fifteen to twenty inches in thickness, hermetically seals the pyrite. Although the mine in a dry season, makes, judging from the appearance of the discharge, about two hundred and fifty gallons of water per minute (and this is enormously increased in wet seasons) not one drop comes off the pyrite, which as pointed out has the appearance of dry sand. In opening up a pyrite prospect, between the gossan cap and the hard ore is found a



Michipicoten Harbor.

zone, varying according to conditions, of pyritic sand, identical in appearance with the Helen mine pyrite.

In the transactions of the American Institute of Mining Engineers, Vol. XII, page 531, W. H. Adams, in an article on The Pyrites Deposits of Louisa county, Va., speaking of the Arminus mine, states: "The pyrites is found at this mine 60 feet from the surface and to the 150-foot level is generally decomposed and granular in form."

Quoting Schönichen *re* Spanish and Portuguese mines, Dingt. Journal, clxx., p. 448, Adams says: "Their shape is that of large lenticular pockets in metamorphic clay slate, from twenty to thirty-six fathoms thick and extending to a length of 170 to 200 fathoms. The whole bed is filled with pure pyrites without appreciable gangue. These beds are found in a few places at two fathoms below the surface undecomposed and in a sandy condition easily got by pit work. In other places the zone of decomposition reaches from 10 to 50 fathoms downwards." As indicated, just before chemical change occurs, the massive pyrite is broken down into a granular condition, without any appreciable loss of sulphur. At this stage at the Helen mine the process was arrested by the formation of an impervious coating of laminated iron ore.

Iron Pyrites in Conmee Township

Some work has been done on a deposit (No. 22) which lies about one quarter of a mile west of Bridge 31 A, on the Canadian Northern railway, some distance below Mokoman station, on lot B in the fifth concession of the township of Conmee, Thunder Bay district.

The deposit strikes northeast near the contact of conglomerate and the Mattawin Iron range. A deep covering of bouldery gravel obscures the surface, and the deposit can only be examined where a small pit has been sunk on the bank of Beaver creek. The bottom of the test pit is five feet below the level of the creek, and about 80 tons are on the dump. The pyrite-bearing zone appears to be about thirty feet wide.

The occurrence is one of replacement, wholly and in part, of the conglomerate by pyrite, which even when massive retains that structure. The more soluble pebbles have been completely replaced by pure pyritic nodules with a roughly spherical outline. In the other portions of the conglomerate, the substitution is more or less incomplete, the pebbles of pure silica being entirely unchanged.

An average sample of ore on the dump yielded 29.20 per cent. of sulphur.

Tip-Top Copper Mine

This mine (No. 23) is situated nine miles by trail southwest of the Canadian Northern railway at Kashaboiwe station.

Following is a synopsis of the underground workings: Shaft, 200 feet deep dipping 70° to north, and four levels fifty feet apart.

1st level, Drift to East.....	80 ft. in length.
2nd " " West.....	40 " "
2nd " " East.....	70 " "
3rd " " West.....	40 " "
3rd " " East.....	60 " "
4th " " West.....	40 " "
4th " " East.....	65 " "
Cross Cuts:—	
1st level to the South.....	60 ft. in length.
4th " " North.....	140 " "
4th " " ".....	130 " "
Stops:—	
1st Level, East.....	40 ft. long, 25 ft. high, 8 ft. wide.
" West.....	30 " 15 " 10 "
2nd " East.....	40 " 10 " 10 "
" West.....	30 " 10 " 8 "

Shaft No. 2 about 600 feet north of east from No. 1 is fifty feet deep.

Shaft No. 3 about 500 feet east from No. 2 is twenty feet deep.

The plant consists of two boilers, one 70-h.p. return tubular, and one 30-h.p. marine boiler; one hoist, cylinders, 6 by 8 inches; one Ingersoll-Sergeant four-drill air compressor.

W. G. Miller in the Twelfth Report of the Bureau of Mines, 1903, page 102, describes the rock association as follows: "The ore body strikes approximately east and west, and lies at or near the contact of tale schist on the north and green schist on the south. Along this line of contact there has been considerable disturbance, with perhaps some faulting, and a felsite dike parallel to the ore body.

"The green schist, judging from its character at the bottom of the shaft and on the south along the edge of the ore body, appears to be an altered or squeezed quartz diabase. A short distance west of No. 1 shaft, diabase showing little alteration and containing quartz grains is exposed in places. It shows the characteristic spheroidal weathering. The quartz grains in the schist and in the diabase are often bluish in color.

"On the third level of No. 1 shaft, the felsite dike has been cut through to the north of the shaft, and ore lies on either side of it. The ore consists of copper pyrites, pyrrhotite and iron pyrites. It carries values in gold in addition to the copper. The values are found both in the schist and in felsite and quartz. What has been called chalcedony appears to be a very fine grained aphanitic felsite or quartz porphyry. To the east of the present workings and near the boundary of the location is an outcrop of gabbro."

Although the Tip-Top is essentially a copper mine, an examination was decided upon with a view of ascertaining the availability of the ore as a source of sulphuric acid, especially in view of the fact that the resulting cupreous cinder, *i. e.*, after the elimination of the sulphur, would form an admirable flux for the elimination of silica in smelting the ore of the Bruce mines and surrounding district. This expectation, however, was not realized, and although massive pyritic lenses in the mine would run upwards of 40 per cent. in sulphur, there are extensive associated bodies of leaner and very highly siliceous ore requiring a large amount of iron. The production of sulphuric acid from a large proportion of the Tip-Top ore is quite feasible, but the question is one of economics, and the alternative of utilizing the fuel value of the sulphur in the ore in pyritic smelting is one of comparative costs, and does not pertain here.

A force of ten men was in charge of mine captain Sandow.

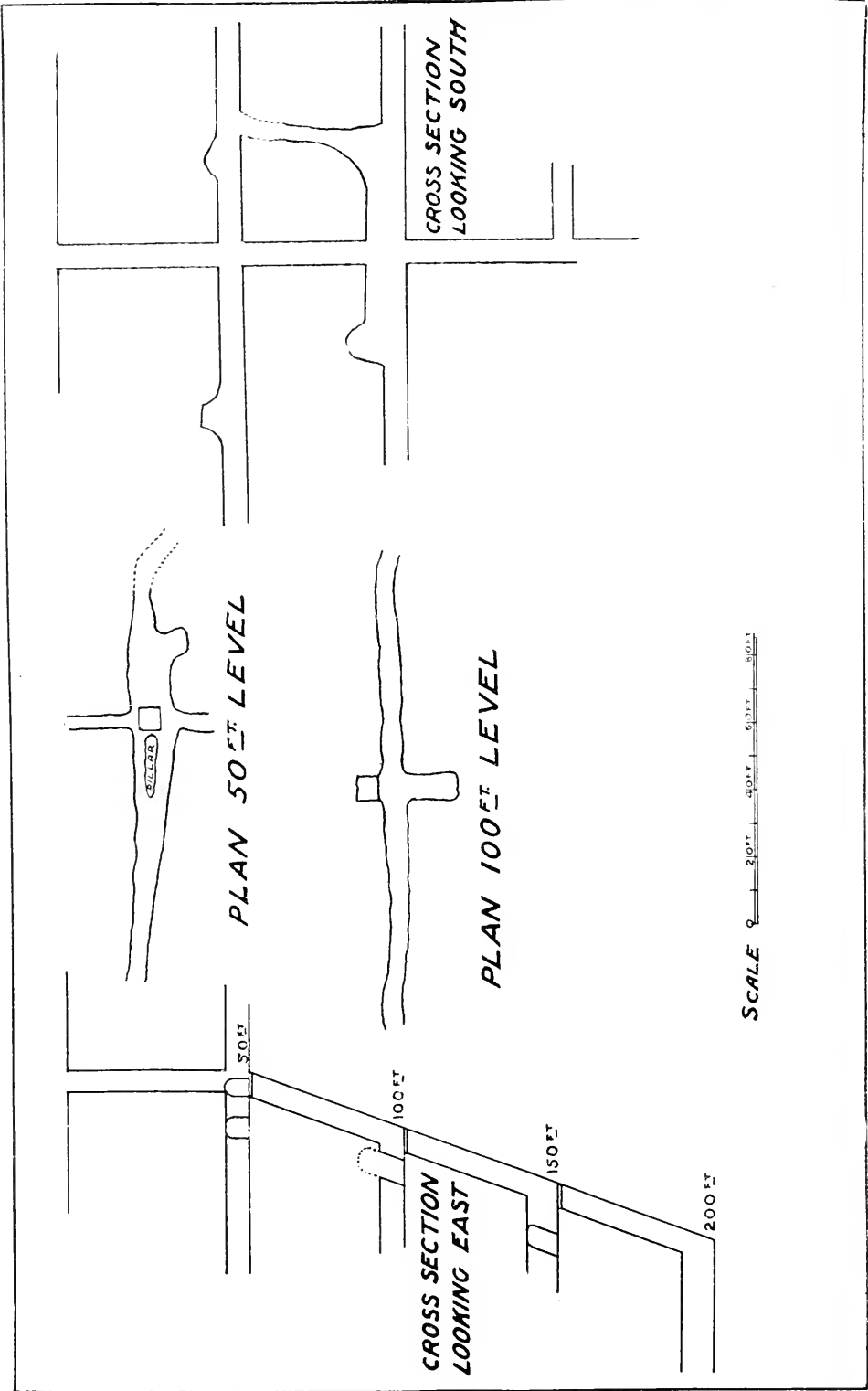
The Steep Rock Lake Deposits

This range has proven of great interest to geologists and has been thoroughly prospected for iron ore. It lies north from Atikokan station on the Canadian Northern railway.

Three-quarters of a mile west from the shore of the lake the Mackenzie and Mann locations A L 461 and 462 have been prospected by four diamond drill holes. It is said that these disclosed a deposit of pyrites (No. 24), but details are not available. The country rock on the surface is interbanded silica and highly altered green schist. A peculiar graphitic calcite was observed here, similar to the occurrence of graphite in the crystalline limestone of Eastern Ontario. Along the trail is a small deposit of brown hematite six feet deep lying on the edges of the schist.

A very large deposit of iron pyrites (No. 24) has been uncovered at the southern extremity of Straw Hat lake. This is reached by a trail to the westward from the southern part of the eastern arm of Steep Rock lake. The work done comprises trenching, test pitting, and four diamond drill holes on locations 857X and 858X. The south trench shows a width of pyrite of over 140 feet, the eastern sixty feet of which would be quite high grade at shallow depth, as the only impurity was gossan. The ore showed unequal banding and nodular weathering. The eastern portion of the trench is somewhat siliceous, and would not run more than 38 to 40 per cent. of sulphur. A test

¹ Geo. Sur. Can., 1897, p. 55-56 H. Am. Jour. Sc., Vol. XIII., 3rd series, 1891, p. 317-331. Bur. Mines, 1895, p. 70-71; 96-98. Do., 1901, p. 133. Do., 1902, p. 309.



Assay map, Tiptop copper mine, Kashabowiwe, Ont.

pit 100 yards to the north near the camps shows very fine pyrites under a heavy capping of limonite and hematite. The hill on which the south trench is located is thirty feet high, and the whole gully to the west appears to be underlain with pyrite. Diamond drilling disclosed the pyrite in the form of a vast crescent, between the horns of which lies a deposit of hematite, an occurrence resembling very much that of the Helen iron mine.

The country rock to the west is an eruptive greenstone, and to the east green schist. These along the trail to Steep Rock lake show at times a curious ellipsoidal weathering.

The deposit is four miles level draw from the Canadian Northern railway to the southwest.

Other Rainy River Prospects

The sulphides of Nickel lake, of Turtle river, and of the Pipestone Lake iron range have been very little prospected, and whether several of these great gossan ranges (No. 25) are underlain with pyrite or pyrrhotite is as yet unknown. Work has been done at certain points on pyrrhotite, in the belief that it was nickeliferous, but except for diamond drilling on one location the pyrite has been ignored.

A. P. Coleman in the Report of the Bureau of Mines for 1894, page 74, states:

"Iron pyrites is found in quantities that may prove important in the future on the shores of Nickel lake between Grassy Portage and Rice bays. On 577P and 580P under a thick gossan of brown iron ore, one finds masses of solid pyrites several square yards in extent, and more than a foot in thickness. As little or no stripping has been done, one can hardly form an idea of the extent of these deposits. The mineral exists as a rather coarse granular mass in which the usual cubes may be seen. As it is common iron pyrites, and not pyrrhotite, the name Nickel lake is misleading, and it is probable that the locations were taken up there under a misapprehension."

This range extends for a considerable distance along the valley of the Little Turtle river, but as no work had been done, and the reports of timber rangers, etc., were exceedingly vague, a personal examination was not made. No prospectors of that district were met who knew the distinction between pyrite and pyrrhotite.

In the Eleventh Report of the Bureau of Mines, 1902, page 134, Dr. Coleman again refers to a deposit near Nickel lake, as follows:

"On the south side of Nickel lake in Watten township, however, a few miles farther west, the railway cuts through a considerable stretch of the Iron range, here of a somewhat unusual character consisting largely of granular silica, occasionally banded with magnetite, but more often heavily charged with sulphides, especially pyrrhotite. In places the sulphides become massive, hardly anything else being present, and one band of pyrites 15 feet thick just at the shore of Nickel lake may in the future be of importance as a source of sulphur. . . . Along with the granular silica of this narrow bulb of the iron range which strikes east and west on the south shore of Nickel lake, there are strips of black carbonaceous slate just like the black shale or slate of the Helen mine, and many other parts of the iron ranges to the east."

The Pipestone iron range was not examined, but from its similarity to the other western ranges associated deposits of iron pyrites may reasonably be expected.

North of Riddell Siding

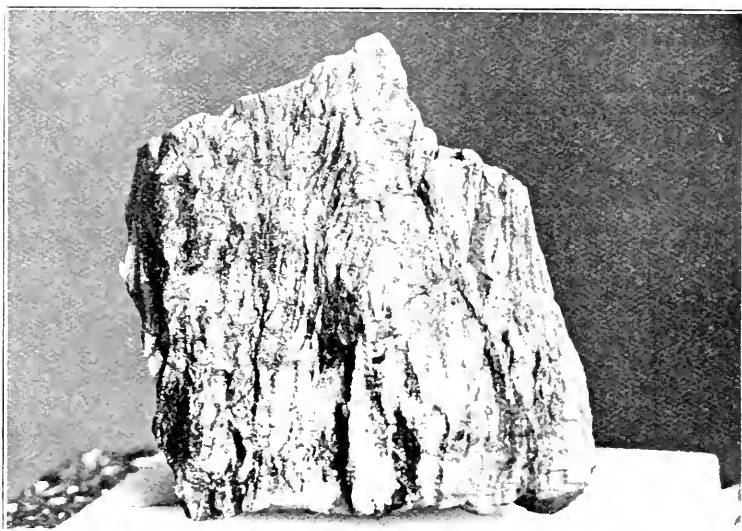
Locations A 274, A 257 and A 273 (No. 26) are situated about one and one-half miles north of Riddell siding on the Canadian Pacific railway. Here a heavy fahlband strikes in a northeast direction along a range of bare hills. In all the valleys and depressions along the range, high grade limonite is found. Some of this may have resulted from the decomposition of pyrites in place, but for the most part it has been derived from oxidation along the hills and subsequent deposition in the depressions. It was impossible to arrive at the depth of the limonite, but the surface area was quite extensive. No high grade gossan was observed in place on the hills, and the fahlband was in the main low grade. A small test pit, however, near the shore of a lake disclosed promising gossan and very fair pyrite. The country rock is a felsitic schist cut by numerous pegmatite

dikes. It is said that a twenty foot shaft has since been sunk with good results, and that later operations have disclosed a considerable body of mixed pyrite and pyrrhotite running about 45 per cent. in sulphur.

The Michie Pyrite Mine

The Michie mine (No. 27) is situated on locations H. W. 716 and H. W. 715 at the shore of Big Vermilion lake about 35 miles northeast of Dinorwic on the Canadian Pacific railway.

The work done consists of a shaft 110 feet in depth and several test pits. A rocky ridge strikes somewhat north of east, and the deposit lies in a depression between this and the lake shore, running into the lake towards the west. The surface is obscured by a heavy blanket of boulder clay from 8 to 20 feet in depth. The only place where gossan outcropped was at the shore where the clay covering had been washed away. This gave the lake its name of Vermilion, and led to the discovery of the deposit during a prospecting trip for gold. The shaft has been sunk on the hanging wall side in country rock, but toward the bottom banded pyrite came in and a 12-foot drift to the south at



Specimen showing banded structure of vein near hanging wall, Michie mine.
Light = pyrite ; dark = schist.

the 90-foot level was all in this material. The shaft is 7 by 9 feet inside timbers, and is fairly dry, making only about five buckets of water per hour. About 75 feet south of the shaft a test pit discloses high grade pyrite. To the southwest of the shaft a prospect shaft has been sunk to a depth of thirty-five feet, the bottom of which is all in very high grade ore. At the lake front four test pits and a fifty-foot trench angle slightly across the deposit. These were said to show the same high grade ore to a width of one hundred feet. It was also stated that borings for a distance out in the lake of two hundred feet showed similar results. Although the heavy covering of clay renders it impossible to obtain exact measurements, there is here a large deposit of very pure pyrites that will run practically the theoretical percentage of sulphur. Some of the ore shows a laminated structure. The interbanded pyrite and rock near the hanging wall side, as disclosed by the shaft and cross-cut is suggestive of true vein filling, especially as some tourmaline was observed along the northern edge of the deposit. The laminated structure of the ore, however, renders it more probable that the deposit is of the replacement type, and that the banded pyrite and rock along the northern edge

represents incomplete replacement of the schist. The country rock along the hanging wall side is composed of a greenish highly calciferous schist. The gangue matter of the pyrite is quartz.

The junction of the main line of the Grand Trunk Pacific railway, and its Fort William branch lies about four miles across well timbered and good agricultural country to the north.

The Fanning Prospect

This prospect (No. 28) is situated on the shore of Big Vermilion lake, eight miles west of the Michie mine. Some trenching through a blanket of boulder clay about four feet in thickness has been done at the extreme end of a point. High grade pyrite in seams from two to six feet in thickness is interbanded with graphitic shale. The deposit strikes east and west, and dips toward the shore to the north. It is said that borings in the lake out from the shore disclosed high grade pyrite to a width of twenty feet. The deposit dipping toward the shore could be very readily prospected by means of a diamond drill.

The Morley Prospect

This prospect (No. 29) is situated about three miles southeast of Schreiber on the Canadian Pacific railway, and about two miles from the north shore of lake Superior.

The work consists of a trench 36 paces long and eight feet deep, running north and south along the strike of the deposit, which lies between trap to the east and quartzite to the west. The pyrite is practically pure on the east side, but towards the west becomes mixed with pyrrhotite, and across a width of six feet is changed almost entirely to the latter mineral. Twenty-five feet to the east and farther down the hill a shaft has been sunk on a parallel lens. The shaft was filled with water, but judging from the quantity of material on the dump, would be about sixty feet in depth. The pyrite runs almost the theoretical percentage, but the major part of the dump is composed of pyrrhotite and intermixed pyrrhotite and rock. One hundred feet below, towards the bottom of the gully, a tunnel twenty feet in length has been driven into the hill to the east, with a cross-cut thirty feet in length, disclosing a very lean mixture of pyrrhotite and rock. One-quarter of a mile to the north, test pits have been sunk on some stringers of pyrite, the extent of which it was impossible to ascertain owing to the thoroughness of the weathering.

The Otisse Prospect

This location, 776 X (No. 30), lies about one and a half miles north of Schreiber at the north end of Cook lake.

A heavy fahlband strikes east and west for about a mile. The gossan capping had in several places been removed and test pits sunk. The largest of these was about twelve feet deep and twelve feet long across the strike of the deposit, which is here seen to consist of a very fine grained mixture of pyrite, pyrrhotite and silica. An average sample of the dump yielded 32.26 per cent. of sulphur.

Goudreau Lake Deposits

These extensive pyrite ranges (No. 31) lie about eighteen miles in a straight line to the southwest of Missanabie on the Canadian Pacific railway, and about three miles by trail west of the western end of Goudreau lake.

The country between Dog lake and Goudreau lake is composed of green schists cut by felsitic and greenstone intrusions. At the outlet of the more northerly lake of the Two Sisters, the formation consists of a fine grained conglomerate with pebbles the size of a small pea in a soft green cementing material. Three miles to the north this shades

into a very coarse conglomerate, with light colored boulders upwards of twelve inches in diameter. Proceeding from this point up the creek flowing out of Goudreau lake, considerable disturbance has given the conglomerate a foliated structure, and the boulders are very flatly compressed, with the longer axes parallel to the schistosity. West of Goudreau lake, however, the conglomerate has shaded into a green schist.

The writer fortunately had extended to him the hospitality of Mr. E. C. Wylde, of the Lake Superior Corporation, without whose guidance it would have been impossible to find the deposits, as the trails had been obliterated by fire and subsequent growth.

For convenience the ranges will be roughly described as the North range, comprising deposits "A," "C" and the "Bear claim," and the South range, comprising deposits "B," "D" and "E;" True's trail running north of east between the ranges.

Approaching the deposits from the east, the trail passes to the south of the Bear claim and along the northern edge of two small lakes. At the western end of the second lake True's trail proceeds in a westerly direction. Another trail runs north to deposit C and another to deposit B in a southwest direction.

The prevailing formation at the lakes is a green schist. This has however been in places metamorphosed by the intrusion of greenstone to the north, to a vitreous hornstone schist. A well defined contact occurs a short distance to the north of the western end of the first lake.

Deposit C

For about four hundred paces north of True's trail, the path to deposit "C" passes over low ridges of rusty schist, and then through a depression underlain with limonite. Parallel with this, and striking east and west, runs a low ridge of pyrite with green schist to the north. A surface cross-cut here discloses a width of fifty feet of fairly high grade pyrite except for some bands of green schist, which could be easily culled out, and fine intermixed silica. The pyrite on the side of the ridge is covered with a thin scale of gossan which deepens towards the depressions. The total length of deposit "C" as disclosed by sixteen pits is about six hundred feet.

Deposit A

A short distance to the north and slightly east of "C" is deposit "A." In the vicinity of the hill on which the camps are situated, all of the depressions are underlain with limonite. Except for a few trenches, the exploratory work here took the form of diamond drilling. In the Fifteenth Report of the Bureau of Mines, 1906,⁴ Dr. A. P. Coleman says:

"A section across the low hill near its west end shows green schist to the south, then limestone with some pyritous schist, 30 feet of pyrite, 12 feet of green schist 9 feet of pyrite and green schist to the north. There seems to be little continuity in the structure, however, and sections at different points vary greatly among themselves. Pyrites or gossan extends about 400 feet from east to west, with a width of about 150 feet; but it is greatly mixed with other materials, especially schist and limestone. It is stated that a diamond drill hole on "A" claim showed pyrite to a depth of 169 feet averaging about 35 per cent. sulphur."

Deposit B

Deposit "B" is reached by a trail about one-quarter of a mile long in a southwest direction from the outlet of the second lake. The central portion of this trail passes along a light colored siliceous schist studded with small broken crystals of hornblende, suggesting a sheared granite. Deposit "B" lies on the northern flank of a rocky ridge striking east and west and forming the southern shore of a small lake. Along the side hill, trenches reveal a length of 900 feet of either pyrite or gossan, and the lake bottom on that side appears to consist of limonite. The pyrite here, although somewhat interbanded with green schist, is of fair grade. On the side hill where drainage is good the

⁴ Page 186.

capping is very thin and laminated, but becomes a considerable body of limonite in the lake and the depression at the eastern extremity.

Deposit D

Along the south end of a hill a short distance west of the lake is deposit "D." The exposed pyrite has here weathered in a very peculiar manner, fresh fractures showing an ore of much lower grade than the surface would indicate. This deposit is the smallest and lowest in grade of the series.

Deposit E

A short distance to the west across a small muskeg lies deposit "E." The following is quoted from Dr. A. P. Coleman's description of the Goudreau Lake pyrites deposits in the Report of the Bureau of Mines, 1906⁵. His account of the north trail which was not taken by the writer is also quoted:

"The first outcrop toward the west named "E" by the prospectors who explored it, runs east and west for about 100 feet, and in cross section shows from south to north,

Pyrite with some green schist	8 paces
Limestone (mostly hidden by debris)	6 "
Pyrite.....	4 "
Green schist (strike 100°, dip 60° S.)	33 "
Pyrite with some cellular silica	29 "
Very rusty banded silica (dip 25° S.)	15 "
Width of section.....	98 paces

"Just to the west of the hill top on which the section was measured, the limestone and much of the pyrites have been dissolved out as a narrow ravine, and here a shaft 25 feet deep has been sunk. The materials on the dump are mainly limestone, but with some bands and knots of green schist and many masses of pyrite—sometimes interbanded with the limestone."

"The limestone is exactly like that of the Grenville series, but the silica at the north end of the section is unmistakably Iron formation, though with little interbanded magnetite. The pyrites often has a porphyritic look, large crystals being embedded in a finer ground mass."

"A short distance to the north of this lake along the path from outcrop "E" a nearly straight band of crystalline limestone was followed for 410 paces. In some places it is thirty feet wide, though generally less than that, and parallel to it on the north runs a long depression sometimes showing gossan on its north side and perhaps representing a band of pyrites. The limestone is white or gray, and dips about 80° to the south with a strike nearly east and west. After the 410 paces diorite seems to cut off the limestone, but 160 paces to the east there are two sink holes running east and west as narrow trenches. The largest is 15 feet long and 8 or 10 feet deep, with six feet of partly decomposed pyrite at the bottom."

Bear Claim

As the writer did not have an opportunity of examining the Bear Claim, Dr. Coleman's description of it is also quoted:⁶

"The most easterly deposit, called the Bear claim, displays many interesting features, and has the largest extent of all the outcrops seen, with a length from east to west of 1200 feet and a width of nearly 300. To the west there is low peaty ground with small pools containing a foot or more of ochre or bog ore probably leached from the deposit, and much of the deposit itself is gossan covered or hidden beneath drift.

"A stripping near the middle shows gossan or pyrite at several points across the strike over a width of 150 feet, but no stripping crosses the full width. Towards the east walls of green schist or schistose hornblende porphyrite, rise on both sides, and at the east end of the deposit the appearance is that of an amphitheatre with walls 50 or 75 feet high. Here pyrites seems to dip in all directions under the hornblende porphyrite, as if it was a dome with the top removed. The pyrites has weathered out near the top of the wall of the amphitheatre, leaving the schist projecting over it like an eave. Whether the valley was formed by the destruction of pyrites is uncertain,

⁵ Pp. 184-5.

⁶ Fifteenth Rep. Bur. Min., 1906, p. 186.

but the arrangement suggests this. The pyrites of the Bear Claim seems more mixed with rock matter than in most of the deposits, but it covers a far larger area than any of the others."

The above descriptions show the very considerable pyrite-bearing area, and indicate the meagre amount of the exploratory work in proportion to that necessary for arriving at any adequate estimate of quantity and grade of available ore. A large extent of gossan and bog-ore covered depressions has not as yet been prospected. It is not unreasonable to expect that in some of these, deposits of pyrite, higher in grade than those of the hilly outcrops, may be found. Deposits "B" and "C" are higher in grade than the others, and, with very little culling, their product should run approximately 40 per cent. in sulphur. In the other ore bodies workable lenses of 40 per cent. ore, doubtless occur. The remaining material running between 25 and 35 per cent. in sulphur could readily be concentrated to a 48 or 50 per cent. product. The plant is quite simple, and the operating cost in a country replete with water power, should not exceed 60 cents per ton. The over burden of limonite is by no means insignificant economically, and will repay removal, especially if taken away before it becomes contaminated during the mining of the pyrite.

Some of the deposits are associated with outliers of the Iron formation, but the proximity of the eruptive greenstone to the north is suggestive of some of the Eastern Ontario occurrences.

Pyrites South of Chelmsford

The Clark pyrite deposit (No. 32) is situated on lot nine in the sixth concession of the township of Creighton, Algoma district. The strike is easterly. A trench fifty feet long, and three to twelve feet deep across the strike, shows gossan all the way. The gossan towards the north has clearly been formed by seepage from the deposit, which appears to lie along the side of a rocky ridge. Owing to the small amount of work done and the rapid oxidation, no pyrite could be observed in place, but some pieces in the dump were very high in grade.

The country rock to the south is a mottled crystalline schist, quite massive in structure.

The adjoining lot to the west, locally called the Craig and Hamilton property, has been prospected for copper. The work consists of several trenches, test pits and a sixty-foot shaft which has been sunk through interbanded iron pyrites, chalcopyrite, bornite schist and graphitic shale; the last being present in large quantity. The appearance of the dump indicates that if properly culled, the ore would grade high enough in sulphur content to be available for acid-making purposes.

These prospects are seven miles by good wagon road from Chelmsford station on the Canadian Pacific railway, and four miles across level country from the track.

North of the Height of Land

On an island portage on the Mattagami river, between its junctions with the Kakozhisk and Kapuskasing rivers, is an iron pyrites deposit (No. 33) referred to by A. G. Burrows in Report of the Survey and Exploration of Northern Ontario, 1900, page 66, as follows:

"The first of these (*i.e.* rapids) is passed by a portage over the island on the west side, and the second requires a lift out. At the former was observed a vein of quartz stained with iron oxide. The quartz is impregnated with pyrite and garnets. This vein is thirty feet wide and showed for forty feet. A sample of the vein material, nearly all iron pyrites, showed on assay \$1.40 a ton of gold."

Referring to the same deposit, E. L. Fraleck on page 77 of the same Report states: "A band of highly oxidized ferruginous matter and pyritiferous quartz runs with the strike of gneiss, south 20 degrees west."

There is at this place, undoubtedly, a deposit of iron pyrites, but as no trenching has been done it is impossible to state definitely the quantity or grade.

In the Report of the Bureau of Mines, 1895, page 255, E. B. Borron quotes John Driver's description of a large pyrite deposit (No. 34) on Big river, a tributary of the Opazatika river. From this the following interesting extracts are reprinted.

John Driver starting out from Brunswick Post states:

"We followed the Missinaibi down to the Opazatika portage, which is in a straight line northeast 40 miles, and thence crossed over to Opazatika lake, which is $3\frac{1}{2}$ miles south of Missinaibi river. From the west end of Opazatika lake to the junction of the Big river is 42 miles northeast, so that the distance over all in a straight line from the southwest end of Missinaibi lake is 91 miles, including $5\frac{1}{2}$ miles up the Big river to the pyrites bed or vein. Having looked over the vein, which I had no trouble to find, the next work was to cut out a path or road on the south bank down to the camp, a distance of $1\frac{1}{2}$ miles. . . . We uncovered the rock along the south bank the full width of the bed of pyrites, which is thirty-five feet from wall to wall. I put in two shots, which broke up the vein rock two feet deep, from which I got specimens. I then uncovered the rock 100 feet back from the bank, and found the vein covered over with a foot of sandy loam. My men uncovered the vein from wall to wall, and I found it to be 35 feet wide. The course is northwest 20° west, and at an angle of 65° east. In tracing the vein south I found it to be deeply covered with soil. The rock gradually rises in going back from the river, and at 300 yards is about 20 feet above water level of the river.

"When Mr. Borron explored Big river in 1886 he thought that the rock in the river was a boulder from which he got his specimen, but I found it to be part of the vein, 15 feet wide and 2 feet above the water. It crosses one-third of the river on the south side about 200 yards up stream. The river here takes a bend to the south, and comes back on itself, so that in following the course of the vein on the north side, it cuts across this point of land, which is a drift soil. . . . However, in following up the course, I found the vein to crop out at the foot of the rapid on the south side of the west branch of the forks of the river, half a mile northwest from the place where I had been working. Here the rock is deeply covered with stiff clay. I got the men to lean off the part of the vein, and took what specimens I could break off with my pick hammer. From the surface, the pyrites at this place does not look as good as at the lower place, although I am quite sure it is the same vein. The rock is so deeply covered with clay soil that I could not follow it any farther, but no doubt it continues on for a much farther distance northward. In following up some three hundred or four hundred yards, I found that the country rock took a change, being on the west side of the vein Laurentian, while on the east side, and all the way down the river to the first rapid, it is a slate, what I take to be a Huronian."

No estimations were made of John Driver's samples for sulphur. In Report of Exploration, 1900, page 81, E. L. Fraleck states:

"At Lower Island portage on the Mattagami river there is every indication of a considerable body of iron pyrites, while Borron reports another deposit on one of the tributaries of the Opazatika river. To the north are large formations of limestone and dolomite. If it were desired to purify the pulp in that country, the raw material for the manufacture of the sulphite liquor and the elimination of the resins, is there available."

Deposits Elsewhere

In the vicinity of Rossport and Jackfish on the Canadian Pacific railway, north of Lake Superior, locations have been taken up for gold, that seem to carry pyrite in sufficient quantity to warrant the expectation that they may develop into pyrite mines. Not being able to obtain authentic data as to the exact localities, the writer was unable to visit all these prospects.

In other districts, especially in the Sudbury region, prospectors appear to have at times opened up deposits of pyrite which were abandoned when nickel was found to be absent.

W. G. Miller in his report on the Iron Ores of Nipissing District, discovered extensive belts of pyritous formation paralleling the iron ranges. He suggests that they form with the jaspilite ranges alternate legs of an eroded anticline. It is possible that these may form a source of pyrite, so soon as the districts in which they are found are provided with transportation facilities.

Pyrite under Hematite

Several hematite localities in Eastern Ontario are known to be underlain with pyrites deposits. These have as yet been unexplored, but in years gone by various hematite properties were worked for iron ore, until contamination from pyrite became so great as to prevent further shipments, when in every instance the property was abandoned. The workable depth for iron ore varied between 50 and 70 feet. From the bottom of the largest hematite deposit in Eastern Ontario, the writer has seen pieces of ore with an inner core of high grade pyrite upwards of a foot in diameter. In some instances the ore consists of the soft red hematite, and in others the hard dense pyrite. There seems to be no doubt that these hematite deposits were at one time the gossan capping of the sulphide ore bodies, and that metamorphism due to disturbance or igneous eruptions has changed the limonite into hematite. In only one case of this kind has development taken place, namely, at the Eldorado copper mine, where it has been shown that a hard dense hematite has resulted from the alteration of a copper and iron sulphide underneath. The depth of alteration there varied between 60 and 80 feet. In the Report of the Geological Survey of Canada, 1873-74, page 222, B. J. Harrington speaking of iron pyrites states: "At the Dalhousie mine there is none visible in the ore, but, on sinking a trial hole a short distance southwest of the present workings, instead, as was expected, of coming upon the hematite, a bed of pyrites 4 feet thick is said to have been struck—a fact suggesting that the hematite may be the result of the decomposition of pyrites." It is the opinion of the writer, that with very few exceptions, nearly every hematite ore body in Eastern Ontario at least will be found to be underlain by a sulphide deposit of some kind, if not pyrite in every instance.

Geological Relationships

The nearest distance in a straight line from the most easterly to the most westerly deposits examined is about 900 miles, and from the most southerly to the most northerly deposit about 500 miles. Owing to the crescent shaped curve of the Province of Ontario around the Great Lakes this does not by any means represent a triangle of those dimensions. In the Bureau of Mines Report for 1894, T. W. Gibson states the area of Ontario to be 200,000 square miles, 60,000 of which lie south of the French and Mattawan rivers. Allowing 20,000 square miles for the post-Cambrian formations of southwestern Ontario, and 10,000 square miles for the Devonian of the extreme northern part, leaves approximately 170,000 square miles, throughout which the pyrite deposits have been found.

Regarded from the point of view of their geological relationships, the iron pyrites occurrences can be roughly grouped in three classes:

(1) The Gneissoid, comprising the Brockville and Mattagami deposits. In both cases basic dikes are in close proximity.

(2) Those of the Iron formation, comprising the Helen, Straw Hat lake, and probably the Goudreau lake deposits; those in the crystalline limestone of Eastern Ontario are similar in origin, if not in age.

(3) The remainder are associated with the crystalline schists with, in almost every instance, an eruptive greenstone close by.

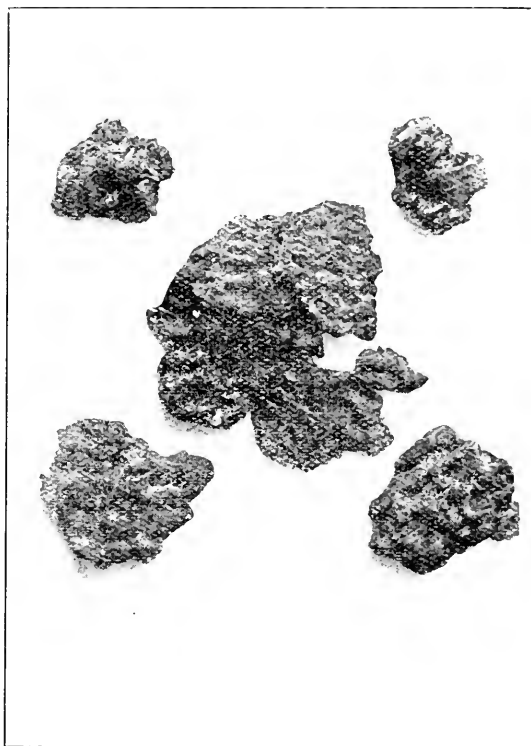
Formation of Deposits

In the case of the Bannockburn mine, as we have seen, the ore bodies are clearly due to facilities for deposition afforded by the folding of the schist. It is possible that a careful working out of the strike of the schists in other instances would reveal similar conditions. The intrusives seem to have no direct effect on the vein filling. None of the minerals produced by pneumatolytic action are found in any of the deposits. But the disturbances due to the eruption, followed by subsequent shrinkage on cooling, would necessarily cause severe zones of fracture and lines of weakness in the surrounding schist.

The pyrite lenses have pronounced dip and pitch, being very similar in these respects to ore shoots in a vein. Parallel lenses are frequent, but overlapping lenses were noted only at the Harris mine, and in that instance are certainly not caused by excessive buckling of the schist.

Graphitic shale is closely associated with many of the deposits, and this carbonaceous material may have had much to do with the deposition of the pyrite. The idea that the pyrite was sedimentary and subsequently formed in lenses by the squeezing and folding of the schist, is practically disposed of by the fact that the occurrences in metamorphic igneous schists differ in no way from those in metamorphic sedimentary schists.

Concentration at certain points in a fahlband by lateral secretion is also improbable, as the wall rocks are always altered though only for a short distance outward. Acid solutions have, however, worked through lines of weakness and fracture, and in some



Limonite deposit on mine timbers, Morley mine.

cases lateral secretion may have been an assisting factor. Whether the solutions were ascending or descending, and other features of deposition will have to wait until further light is thrown upon them by underground work being carried to greater depths.

Conditions of Oxidation

The analyses given in the foregoing pages are only intended to represent the material available for sampling at the time of inspection. It must be kept in mind that in nearly all cases oxidation had set in, but wherever possible the time of exposure to weathering has been given. This, however, cannot be taken as an exact indication of

Prices for pyrite have been increasing slightly during the past two years, but Spanish ore has been falling off somewhat in grade, and contracts have been renewed at slightly enhanced figures. Active prospecting on the American side has failed to disclose any new important sources of supply. The policy being pursued is to re-open abandoned properties, and mine out the lower grade ore formerly passed over.

The average freight rate from the pyrite mines of Eastern Ontario to Buffalo varies from \$1.10 to \$1.34 per ton. In northwestern Ontario, assuming transportation were provided from the deposits to a near point on the Great Lakes, freight charges by boat to points where acid works are situated, would vary from 60 to 80 cents per ton. There is no reason why Ontario should not in the near future be able to exclusively provide the total consumption for acid works situate, not only on the Great Lakes, but also (when we consider that Spanish ore finds its way as far west as St. Louis) for those located some distance inland.

Pyrites is sold to acid works on long time contracts, extending usually from two to five years, and small quantities can only be sold at a certain loss in price. To obtain the best terms from an acid works, not only must a long time contract be made, but constant and uniform deliveries must be maintained during that period. This means that a pyrite deposit must be fairly well developed before the best advantage can be taken of the market conditions.

Requirements of Pyrite Deposits

(1) The deposit must be of sufficient size to warrant the cost of development necessary to maintain a constant supply;

(2) It must be favorably situated for transportation facilities;

(3) It must be free from any volatile impurities, such as lead, zinc, arsenic, etc. Through the development of the contract process, which necessitates washing of the gases, it is possible to utilize certain ores that formerly could only be employed for special purposes. Impure ores, however, notwithstanding high sulphur content, are heavily penalized.

(4) The ore must contain approximately at least 40 per cent. of sulphur content. The scarcity just at the present time, however, of pyrite is such that an ore grading between 35 and 40 per cent. would be saleable, especially if of good roasting quality, but at a somewhat diminished price on account of the extra material requiring to be handled.

(5) The ore must be of good roasting quality. A good burning pyrite ore will roast down to one-half per cent. of sulphur in the cinder. If the gangue consists of easily fusible silicates this percentage will be correspondingly increased. With the improvements in roasting furnaces, however, in recent years, and more care and skill being exercised in the handling of the mechanical adjustments, better results are constantly being achieved, and as much depends probably upon skilful roasting as upon the character of the ore.

Prospecting for Pyrite

When it is considered that out of the comparatively large number of prospects determined, very few were taken up as pyrite properties, that the Hungerford mine was taken up for gold, and a smelter at one time erected on the property; that the Queensboro mine was first taken up for gold and arsenic, and shipments of the ore were made to Marmora; that the Farrell, McIlwraith and other prospects, were first opened up in the search for gold; that the Helen mine is being operated for iron ore; that the

Goudreau lake deposits were located as iron properties; and that it was in prospecting for iron that the Straw Hat-lake deposit and the Mackenzie and Mann locations were discovered; some remarks on prospecting for pyrite may be timely.

The distinction between the yellow iron pyrites and the magnetic variety, pyrrhotite, does not seem to be well known, and yet a simple test for magnetism will distinguish one from the other. The theoretical percentage of sulphur in pyrite is 53.2, and in pyrrhotite, 39, so that an analysis for sulphur will readily distinguish them.

Although pyrite deposits are not in every instance accompanied by a fahlband, yet this is almost invariably the case. Of course, there are thousands of fahlbands that contain no pyrite deposits, but every zone of imperfect pyritic impregnation that possesses adequate transportation facilities, should be prospected for pyrite.

A careful inspection should be made along the strike, and test pits should be sunk on any outcrops of gossan. A special scrutiny should be devoted to those portions of the fahlband in the vicinity of igneous intrusions. It is very rare to find gossan outcropping on the surface. Lumps and pieces, however, are often found in the soil, and underneath these the gossan is frequently found in place.

Test pits should be sunk on all spots where the soil is of a deep red color, although this sometimes results from leaching and deposition in depressions from a low grade portion of a fahlband. A deep red color is, however, greatly sought for by prospectors in Eastern Ontario. In a great many cases the gossan is found immediately below this soil, which becomes more and more red in color until the gossan is reached. The character and depth of the gossan depends not only on the grade of ore underneath, but, also on the position of the outcrop. Where drainage is fairly good, but yet not too rapid, the gossan will be of the character of an impure hematite, as at the Hungerford mine, where 23 feet was sunk in this material before any pyrite was encountered. On the other hand, where there are depressions that admit of concentration of surface waters, a considerable deposit of limonite is apt to be formed.

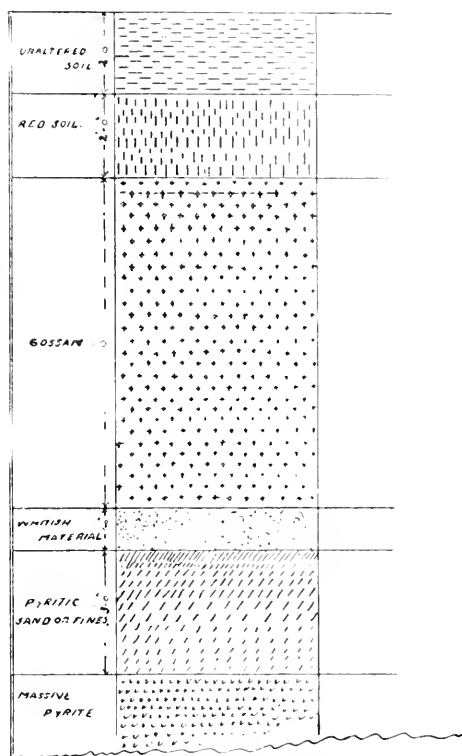
Analyses of Gossans

Analyses of gossans from various properties resulted as follows:

	Per cent.
Clark Prospect	(Iron 42.70
	(Sulphur 0.80
Rib Lake mine.....	(Iron 41.39
	(Sulphur 1.32
Morley prospect.....	(Iron 36.45
	(Sulphur 5.86
Ladore prospect	(Iron 52.85
	(Sulphur ..... .26
Tip-Top mine	(Iron 52.19
	(Sulphur ..... .45
Goudreau.....	(Iron 52.56
	(Sulphur ..... .42
Darling prospect.....	(Iron 55.40
	(Sulphur ..... .30

These samples are not intended to represent any average, but merely to indicate in a general way the character of the gossan. Of course, there are many instances where fairly good pyrites will yield a lower grade gossan, where surface dirt has had an opportunity to wash in and contaminate it. The depth of the gossan varies greatly according to conditions. As a rule, however, the higher grade the deposit, the higher grade will be the resulting limonite. In test pitting, the gossan tends to become darker with depth until a zone of whitish bleached material is reached. This consists of a mixture of pyritic sand, melanterite and gossan mixed with all the intermediate stages of decomposition. Underneath this there is a zone of pyritic sand usually in a moist condition, which can be shoveled out, but becoming more and more massive until the solid pyrite is reached.

The cut herewith gives an ideal section illustrating the foregoing conditions.



Ideal section of pyrite deposit, showing gradation upwards through decomposition products to soil covering.

Developing a Prospect

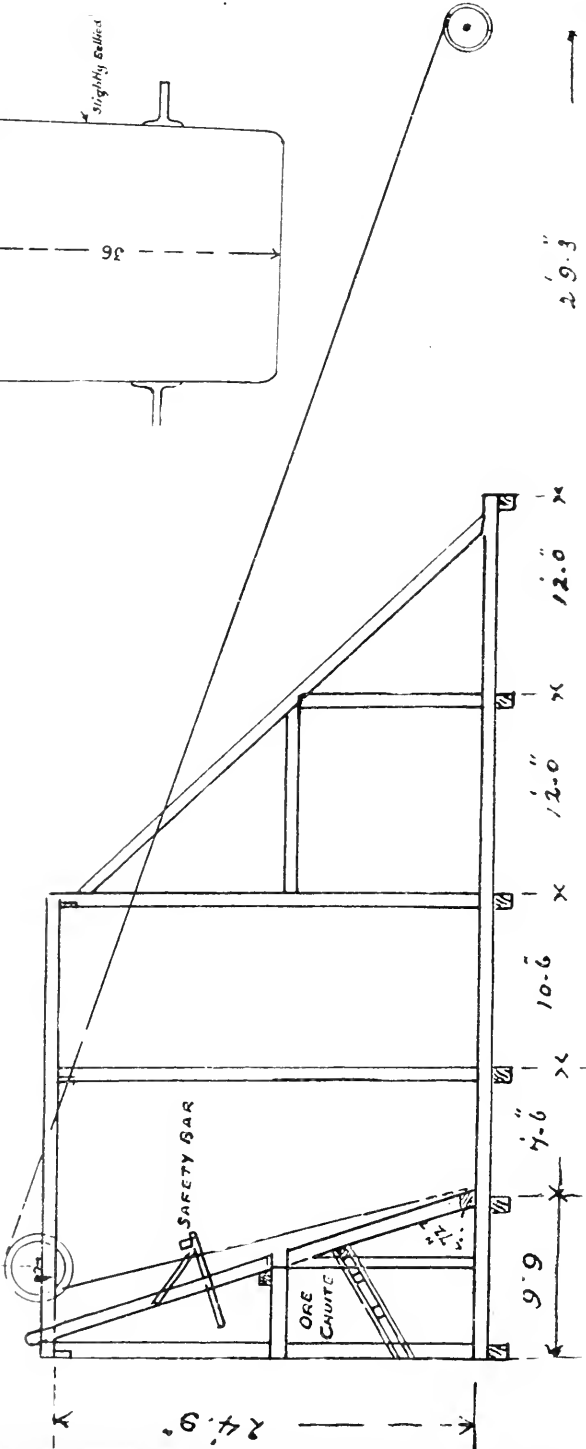
Surface trenching should be done at regular intervals until the boundaries of the lens are established. Care should be taken to ascertain the pitch of the lens along the strike before a shaft is located, or, as in the case of the Bannockburn mine, the shaft will either have to be turned at an angle to keep on the ore body, or considerable barren work done, which will increase in extent with depth as the pyrite pitches away from it.

It is a general practice to use the hand windlass for the preliminary work. A small derrick, however, is inexpensive, and a horse can be used for a straight draw up to 25 or 30 feet in depth without any inconvenience. This not only permits of more rapid work than the hand windlass, but larger loads can be handled, and there is the additional advantage of swinging the material away from the shaft, which saves re-handling. It is also a convenience in culling, as the ore and rock can be dumped in separate places. In opening a prospect ore should be carefully culled as it is taken out, and neatly piled in a separate dump. This point might be emphasized, as in very few of the prospects examined had there been any attempt at culling, but ore and rock had been thrown out together in a confused mass, rendering it very difficult to arrive at the proportions of each.

Pyrite mines are as a rule comparatively dry, but water is usually encountered before the first level is reached. This is nearly all surface water, and comes in through seams and floors in the ore. After reaching tight ground at a depth varying from forty

TIMBERS 12" X 12" SECTIONAL ELEVATION
SHEAVE WHEEL DIAM=44" HEAD FRAME.
33" BETWEEN SKIDS
DRUM 30" X 30"

44.3



Bucket tripping device and bucket, Harris pyrites mine.

to eighty feet, the flow diminishes to a very small quantity. It is a usual practice to trap this water and instal a stationary pump on the first level. At the Queensboro mine, however, water came in to such an extent in the first fifty feet of the shaft, as to render further sinking impossible. A drift was made thirty feet to the east; it being the side from which most of the water was coming. The east 20 feet of this drift was excavated to a depth of five feet, and by throwing a timber across the front this constituted a sump 20 feet long, 6 feet wide, and 6 feet deep. At the entrance to the drift wall plates of 10 by 12 timbers were placed around the shaft and secured by rock bolts. On these, by means of elm plank, clay and cement a trough was constructed, which drained all the water into the water trap provided in the drift. The clay formed a cushion to prevent the cracking of the cement, rendering the drift fairly secure from the shock of the firing. A half hour's work every few days sufficed to keep the troughs in a state of repair. A stationary pump was placed at the entrance to the drift, and a piece of band iron attached to the steam valve of the pump. From this another piece of band iron fastened to a cedar float was suspended, thus enabling the pump to regulate itself as the water rose or fell.

Mining the Ore

The best mining practice consists of sinking a shaft, running levels for every hundred feet, drifting each way on the vein, timbering up mill chutes, and underhand stoping of the ore in the usual manner. Operations at the Bannockburn mine have shown the absolute impossibility of winning ore by the open pit method, or of underhand stoping, removing the whole of the lens as the work progresses. The work of the Hungerford mine, on the other hand, constitutes practically a model of the best practice.

The shafts follow the dip of the ore, and hoisting is done by either bucket or skip. In the preliminary stages of development, of course, the bucket is invariably used. Cuts are here given of an ingenious bucket tripping device, installed by Mr. Harris at the Harris mine, which saves the work of one or possibly two men at the head of the shafts.

As seen by the plans, which were kindly supplied by Mr. Harris, stout lugs attached to each side of the bucket travel on skids until they come to rest in a notch above the grizzly on which ore is to be dumped. As the lugs are set below the centre, lowering away causes the bucket to dump. The bucket is then raised a few feet, and when lowered the lugs catch a pair of curved arms, which, when inverted by lowering of the bucket, completely cover up the notches and allow the bucket to be lowered away down the shaft. It will be noted that the head frame must be within sight of the man at the hoist. The skids at the Harris mine are on an angle of 72° , and should not be any steeper for successful operation. Mr. Harris states that the reason for the safety bar, which prevents the bucket turning backward and discharging down the shaft, is in case a bucket is sent up nearly empty and loaded on one side; but if the buckets are loaded one-quarter full, or more, no care need be taken to have the load even.

In Eastern Ontario, contracts for shaft sinking are let at prices varying from \$14 to \$16 per foot, the contractor supplying his own powder, caps, light, etc., the company bearing all the expenses on the surface. The total expense of shaft sinking would range from \$25 to \$30 per foot, and in watery ground from \$40 to \$50 per foot. Drifting under the same conditions is contracted for at prices ranging from \$6 to \$8 per foot.

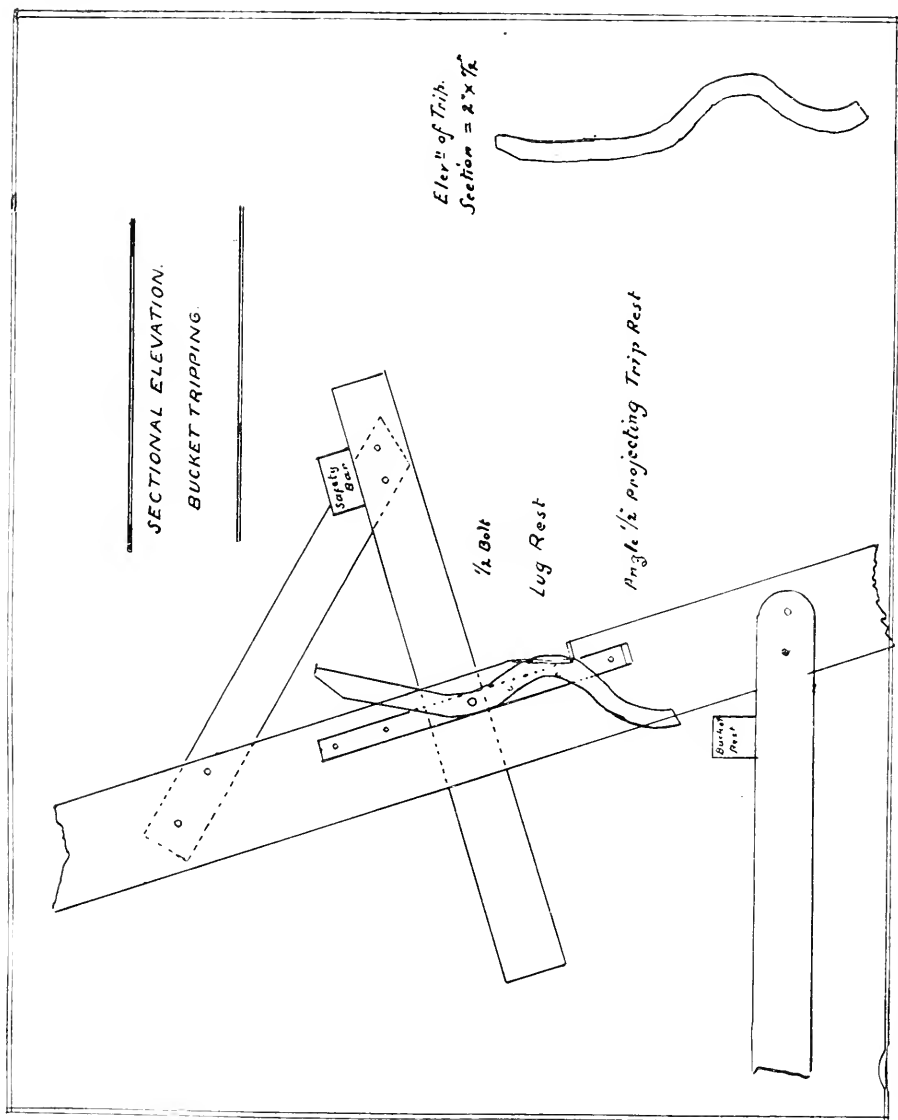
The scale of wages paid in Eastern Ontario is: foremen, \$2.50 per day; expert drill runners, \$1.75 to \$2.00 per day; blacksmiths, \$2.00 to \$2.25 per day; boilermen, \$1.50 to \$1.75 per day; laborers, muckers, helpers, etc., \$1.50 per day. Board is obtainable at \$3.00 to \$3.15 per week. The total cost of mining and preparing the ore for shipment in Eastern Ontario under ordinary conditions ranges between \$1.10 and \$1.30 per ton.

In Northern Ontario prices are fixed by the Cobalt camp at \$2.50 to \$2.75 for drill runners; \$2.75 to \$3 for blacksmiths, and \$1.75 to \$2 for muckers. In this case the

companies provide the men with board. In Northwestern Ontario labor prices are somewhat lower.

Pyrite in other Countries

According to Robert B. Brinsmade in the Engineering and Mining Journal, October 28th, 1905, the pyrite deposits of St. Lawrence county, New York, lie in, and



Details of bucket trip, Harris mine.

are conformable to metamorphic schists of the Oswegatchie series of the Cambrian. The properties produce some lump ore, but the main portions of the deposits require to be concentrated, and in the mining of Ontario pyrite, it will eventually be found profitable to concentrate the low grade material composing the cull lumps. A brief description of the method in vogue in St. Lawrence county, taken from Mr. Brinsmade's article is here given.

The concentrator of the Cole mine is the best equipped on the range. The ore is fed to two 14 by 18 inch Blake crushers, and then goes to a set of 12 by 24 inch Cornish rolls. Water is fed to both crusher and rolls. From the rolls the material is delivered to a trommel 36 inches in diameter and 6 feet length, with 3/16-inch round holes. This is set at 1:20 slope, and is connected to its driving pulley by a flexible joint. The resulting oversize is recrushed in 14 by 19 inch rolls, and fed back to the trommel head.

The trommel undersize, 3/16-inch particles and less, descends to four Hartz jigs, alike in form and adjustment. Each jig has three (24 by 32 inch) beds, with four-mesh No. 16 wire screens. Each bed is 4 inches deep at the lower and 5½ inches at the upper end, below the parting weirs. The concentrate from both the screen and the hutch is delivered by the flume and elevator to the storage bins.

Mr. Brinsmade states that the raw ore contains usually 20 to 30 per cent. sulphur, and the concentrate goes 40 to 50 per cent. in sulphur.

He gives the cost of mining for a production of 110 tons of raw ore, which produced 55 tons of concentrate as follows:

Mining, two shifts of 10 hours each:

1 pit boss	\$2.50
4 Italian muckers	6.00
2 American muckers	3.50
One shift	\$12.00
Two shifts	\$24.00
2 Rock drills, day shift, on contract at 7 cents per ft.—140 ft. average	9.80
Total mine labor	\$33.80
Per ton raw ore .....	.307
Per ton concentrate .....	.614

The cost of milling this ore is stated to be 37 cents per ton of raw ore, and 74 cents per ton of concentrate.

The Stella mine, upon which mining operations have been recently resumed, has five parallel veins on the property. A new concentrator is being built to replace the old one which burned down in 1900, and when a branch railroad is built in 2½ miles from DeKalb Junction, the Stella will be the largest producer on the range.

The High Falls mine is also being operated, and is equipped with a concentrator comprising two jigs with crusher and trommel in a manner somewhat similar to the Cole mine.

The production from these properties has gone mainly to acid works in that locality, especially those situate in Syracuse. It is expected that a considerable market may be found in the sulphite pulp industry of the Adirondacks.

The Davis Pyrite Mine

This deposit is described by J. J. Rutledge in The New York Engineering and Mining Journal, October 13th, 1906, from which the following notes have been selected:

The mine is located in the northwest part of Franklin county, Massachusetts. The foot wall of the deposit is of mica schist, and the hanging wall of quartz schist or quartzite. Intrusions of igneous rocks are common in the immediate vicinity.

Deposits have been opened up along the strike for about 450 feet, and down the dip for about 1,200 feet. Here, as at the Hungerford mine in Ontario, the ore is broken by hand. The undersize from the grizzlies, however, passes through a trommel, having an inside perforated plate with holes three-quarters of an inch in diameter, and an outside plate of three-eighths of an inch perforations. The fines from the trommel are then ready for shipment, but the undersize or "nut ore" is sent to the concentrating mill for crushing and jigging, after first going through a double trommel with inside perforations ¾-inch, and outside 5/16-inch diameter. The undersize from this trommel goes direct to Hartz jigs. The oversize is recrushed, re-trommeled, and is then sent to the jigs. The average of the concentrate from the jigging grades from 44 to 46 per

cent. of sulphur. The total output of lump ore in concentrate averages 3,000 tons per month. This ore finds its way west as far as Detroit, but most of it is consumed in Boston and the surrounding neighborhood.

Deposits in Virginia

These are described by Robert K. Painter in *The Mineral Industry*, 1905, page 522. The following notes have been taken from this article.

The lenses are of varying size: in the Louisa mines, lenses several hundred feet long, and at points as thick as eighty feet, have been worked. In the Cabin Branch mine near Dumfries 10 feet may be taken as the maximum thickness. The larger part of the output of the Louisa mines consists of fines. One mine turns all its ore into fines. At this mine the skip dumps upon a grizzly of railroad iron with bars set 3 inches apart. The slate is picked and forked from the two sizes, which go to their respective crushers at the head of the mill. By successive crushing with breakers and rolls, and screening by trommels, ore is here reduced to jig size and fed by a distributor to the Hartz jigs. Jigging through a bed of cast iron balls is employed, and the hutchies discharge upon a belt conveyer of ascending grade, which delivers to the stock piles where the ore soon drains.

Assuming all the veins to have an average thickness of 5 feet with capacity of 4,000 tons per month, mining is stated to average \$1.63 per ton; ore dressing 47 cents, which with general expenses of 10 cents, makes a total cost of \$1.60 per ton at the mine. Mr. Painter further states that unless a mine be favorably situated with regard to shipping facilities, or contains ore bodies of large size, it should produce ore running not less than 50 to 60 per cent. pyrite to be attractive.

The ore from this locality is almost entirely consumed locally in the large fertilizer industries of the South.

From the foregoing, comparisons may be instituted between these productive points in the United States and the localities described in Ontario.

A certain amount of ore is mined at Pilley's Island, and on the mainland of Newfoundland, which is consumed at the acid works on the Atlantic Coast. These works, however, draw their main supply from the Spanish mines, such as the Rio Tinto.

The Rio Tinto deposits are of enormous magnitude, and occur at the junction of porphyritic rocks and Devonian clay slate. The more important Spanish deposits are located in the Province of Huelva.

Portugal possesses some important mines in the Province of Alemtejo.

A deposit at one time important as a source of pyrite is located in the Avoca district of the county of Wicklow, Ireland. It is associated with metamorphic slates and schists, which have been cut by pyroxenic and felspathic intrusions. At one point carbon is present in the form of graphitic shale. This is another instance of pyrite deposits which have been extensively mined for iron ore before the pyrite was encountered.

France possesses a deposit at St. Julien de Valgalques near Alars, at a contact between Lias shales and Oolitic limestone. Another deposit of similar nature occurs at Soyons.

In Norway are important pyrite deposits at Stordoen and Undal. These contain as high as 2.6 per cent. of carbon, and are black in color from this intermixture. Vigsnaes mine near Stavenger lies in highly folded schists near intrusive saussurite gabbros.

Importance of Ontario Deposits

The Ontario prospects give promise of comparing favorably in extent and grade with any which have yet been found, except the larger Spanish occurrences. The latter, however, which have been mined since the time of the Romans, show signs of exhaustion at some period in the future, and the average output is slightly but steadily decreasing.

in the percentage of sulphur content. As has been seen, very little real prospecting for pyrite has yet been done in Ontario, and the whole industry is still in the prospecting stage; our deepest mine not being down over 300 feet. Nevertheless, the total amount of available ore at the present time will run up into the millions of tons, and there is a large and constantly increasing market near at hand to the south of the Great Lakes. When, however, the importance to a country of large and inexpensive supplies of sulphuric acid, and its far-reaching effects upon a whole series of large and important chemical industries, is considered, the energies of the people of this country should certainly be directed toward conserving these enormous resources to the Province, and working them out as far as possible in our own country into a state available for final consumption.

Sulphuric Acid : Manufacture and Use

It has been often stated that the amount of a country's production and consumption of sulphuric acid is an index of its progress in civilization. This remark is in a general sense true, as the chemical industry above all others requires the greatest amount of technical education and skill; and as nearly every chemical industry in the world uses as a base, or depends upon, sulphuric acid as one of its main ingredients, it will be seen how important it is to a country to possess large amounts of the raw material necessary for this industry.

The largest amount of sulphuric acid consumed in the Province of Ontario is used in the refining of petroleum. In the purification of the distillates, ordinary sulphuric acid of 66° Beaumé is generally used, fuming sulphuric acid being employed in rare cases for varieties of oil difficult to purify. In a treatise on petroleum by W. T. Braunt, page 309, it is stated that the distillates from Canadian oil, for instance, required much more acid and time than distillates from Pennsylvania oil, and that "for purifying American distillates 2 to 3½, and even 4 per cent. (sulphuric acid) is required, the quantity increasing with the yield of crude distillate, since the heavier oils require more acid."

According to W. H. Adams in *The Mineral Industry*, 1899, page 649, it takes one pound of sulphuric acid 66° Be. to produce a gallon of commercial petroleum (kerosene).

The next most important industry on the list is the manufacture of fertilizers.

It takes a ton of chamber strength sulphuric acid to decompose or dissolve a ton of rock in the manufacture of acid phosphate or fertilizer. For over twenty-five years The Standard Fertilizer and Chemical Company^s have been in existence at Smith's Falls. Their raw materials are mainly native phosphate and ammonium sulphate from Germany. They make their own sulphuric acid in a small chamber plant from Sicilian brimstone. The resulting fertilizer is mainly sold in the Eastern townships of Quebec; a few local market gardeners and some Niagara fruit growers are also supplied. Considerable quantities of sulphuric acid are also used by fertilizer works in the vicinity of Toronto, using bone phosphate and waste products from the packing houses. Their product is all sold to fruit growers in the Niagara district.

An ever increasing demand for sulphuric acid is found in the nitro-glycerine dynamite and dualin industry. The acid in making nitro-glycerine is first mixed with nitric acid in the proportion of three parts of nitric to five parts of sulphuric. The sulphuric acid used must be chemically pure, and of the highest possible concentration. Dynamite works in Ontario consume about one-half ton of concentrated sulphuric acid per day.

Sulphuric acid is also used in Ontario in the manufacture of acetic acid. Calcium acetate obtained from the destructive distillation of wood is placed with sulphuric acid in huge iron retorts. Upon the application of heat acetic acid distils over. This industry consumes over a ton of sulphuric acid per day.

^sRep. Roy. Com. Min. Res. Ont., 1890, pp. 169 and 179.

A considerable quantity of sulphuric acid is also consumed in the galvanizing industry. It is used as a bath in which the wires and utensils are dipped for cleansing purposes. It is employed, too, in the tanning industry, and in the manufacture of aniline dyes, alums and other sulphates, wet cell storage batteries, nitric acid, hydrochloric acid, etc.

Roasting the Pyrite

Pyrite kilns or burners are of special design, and roughly speaking, of two main types; one for lump ore and one for fines. On this continent the old hand method of burning is largely discarded in favor of mechanical roasters, and furnaces of the McDougall type are finding favor in the old country. In former times it was considered impossible to roast the small stuff or fines, and hence it was that enormous quantities of granular pyrite were discarded as waste, until the introduction of the Spence furnace by W. H. Adams in 1883, rendering possible the use of this material. In *Mineral Resources of the United States for 1897-1898*, page 575, the statement is made that "It is now possible to construct a mechanical furnace at a cost of \$1,500.00, which will perfectly roast 7,000 pounds of granular ore in twenty-four hours. Such furnaces require but little attention, and no extra cost for labor, thus meeting many objections put forward by chemical manufacturers for the past twenty years. Larger furnaces, which will roast 25,000 pounds American ores daily are constructed at a cost of \$3,000." In *The Mineral Industry, 1894*, page 111, Mr. W. H. Adams states that the cost of roasting by means of the Spence furnace, including labor, fuel, repairs, etc., varies from thirty to seventy-five cents per ton of pyrites.

The Spence furnace, however, is being superseded by others of more recent design, the most popular of which is the Herreshoff. This consists of a series of concentric shelves and rabblers set one above the other. The ore is fed in from the top, and automatically works its way down, discharging at the bottom. The Herreshoff furnace is air cooled, whereas the Frasch furnace has a water cooling attachment. In the Falding Furnace there is a dead air space, which keeps the walls cool, and supplies hot air for concentration pans, etc. The Edwards furnace is finding great favor just now as a desulphurizing equipment in many metallurgical works, and it will be interesting to note the degree of success that furnaces of this type may meet with if their use is attempted in connection with acid plants.

The Chamber Process

Sulphuric acid in times past has been largely produced by the chamber process, which was introduced about 1810. During the last five years, however, this process has had to meet a formidable competitor in the recently developed contact process.

In the old chamber process brimstone, until largely displaced by pyrite, was roasted in specially designed furnaces. The resulting gases in these furnaces pass through a flue into a nitre oven, where meeting with a surface of nitrate of soda (which had been placed there in pots) they are decomposed, and the mixed vapors given off travel on and are passed through a Glover tower. This tower usually consists of a column lined with sheet lead, and filled with fragments of silica, through which the gases percolate. The object of this tower is to de-nitrate the nitrous acid from the Gay-Lussac tower, and to concentrate the acid on its way down. The Gay-Lussac tower is constructed on similar principles to the Glover tower, but is made considerably higher. In this the liquors obtained from the base of the Glover tower meet the ascending gases, absorb the nitrous acid, and are returned. The gases from the top of the Glover tower pass on through flues into chambers constructed of sheet lead connected to each other by leaden flues. Steam jets are introduced into the chambers by which the sulphuric acid is condensed; the nitrous acid gases passing to the Gay-Lussac tower to be recovered as described. The resulting chamber acid varies in specific gravity from 45 to 55° Be

For a great many purposes, such as the superphosphate industry, and the manufacture of alums, this strength is sufficient. For ordinary purposes, however, the acid is usually sold at a strength of 60 or 66° Be., and for many other purposes such as dynamite, alizarine industries, etc., the acid requires to be of the greatest possible strength. To effect this concentration, it is necessary to heat the acid to such a point as to drive off the water. This is effected by means of platinum stills.

Contact Process

The contact process was first perfected by the Badische Anilin und Soda Fabrik at Ludwigshafen on the Rhine, after many years of research and expensive experiments.

The process depends upon the catalytic action of platinized asbestos upon a mixture of air and gases from the burners, converting the sulphur dioxide into sulphuric anhydride. One of the great difficulties met with in the successful operation of the process lay in the fact that the operation was seriously interfered with by the presence of any impurities in the burner gases, arsenic being exceptionally deleterious. It was found possible to completely purify the gases by an extended series of washing and filtration. The gases after washing are passed through a series of vertical tubes filled with platinized asbestos in such a manner as to form a contact with every portion of the gas, and yet not offer too much resistance to their passage. The resultant sulphuric anhydride is rapidly absorbed by water, forming a concentrated sulphuric acid.

Many advantages of this process over the old chamber system are apparent. In the Twelfth Census of the United States on Selected Industries, page 536, these advantages are set out as follows:

"First; No expense of construction and maintenance of the entire chamber system, including the Gay-Lussac and Glover towers and the steam and nitre plant. Second; No expense for nitre and for the sulphuric acid used therewith; although the resulting nitre cake can be utilized, it is rarely a desirable product. Third; The acid used is pure, strong oil of vitriol, requiring no concentration for sale or use. Concentration of chamber acid to high strengths, requires the use of platinum stills, which thereby lose in weight, the dissolved platinum being irrevocably lost. The rate of loss is much reduced by previous purification of the acid, but is always a considerable item of cost. Fourth; The contact acid is also free from arsenic, lead, or iron salts. The fundamental difference in the character of the reactions in the chamber process and those in contact method indicates the possibility of substantial improvements in the methods of roasting. Fifth; Although the 50° acid as it comes from the chambers, is desirable for many purposes—for example in making superphosphates—it is held by some authorities that it can be made more cheaply by diluting the strong acid with the needed proportion of cold water, than by introducing this water into the chambers in the form of steam. This, however, is denied by others, and it is probable that the chamber process will continue to exist, though in a more restricted field."

The success of this process and the extent of its introduction in the past six or eight years, has caused a great many reforms to be introduced in the old chamber system, some of which have proven their desirability.

Shroeder-Grillo and Mannheim Processes

Again, as platinum is a very expensive article, of considerable more value than gold, experiments were actively conducted in an endeavor to find a cheaper contact material. This has led to the perfecting of two other systems of the contact process, the value of which has been demonstrated.

In the Shroeder-Grillo process, by means of soluble salts, the contact substance is restored with very little loss of platinum. By 1901, the inventors of the process claimed that the platinum consumption was reduced to one-eighth.

The Verein Chemischer Fabriken in Mannheim have worked out a process in which ferric oxide (the cinder resulting from the burning of the pyrite) is the main ingredient of the contact mass.

Many contact plants have been erected in the United States during the past seven years, the Schroeder-Grillo being the most popular, and have proven their ability to compete against the old chamber process, even when using the raw material, impure pyrite ores, and also zinc blendes as at the Mineral Point Zinc Works, which are described in the Engineering and Mining Journal, September 1st, 1906. At this plant the Schroeder-Grillo process is used. The washed gases are heated to 490° C., and exposed to the catalytic action of finely divided platinum distributed on particles of magnesium sulphate.

A description of the Mannheim Contact Process by William Wilke is given in the Engineering and Mining Journal of April 21st, 1906. He summarizes the process as follows:

"1. The utilization of the heat of the ordinary roasting process for carrying on the catalytic action of the oxide of iron upon the sulphurous acid.

"2. The purification of the burner gases is a dry process. In all other processes the gases are washed and have to be dried again.

"3. The conversion or catalytic oxidation of that part of the sulphurous acid which passes through the iron contact but has not been converted, is brought about by means of platinum and reheated to the proper temperature by means of the waste heat of the burner gases.

"4. The whole process is carried on by moving the gases by means of exhausters only."

The first plant of this kind in the United States was erected in 1903 at Buffalo, N.Y., and had a capacity of about 1,600 tons of iron pyrites per month which has since been quadrupled. It is also stated that four other firms in the United States have adopted this process. One difficulty in the inception of the process was the fact that the catalytic action of ferric oxide was somewhat imperfect. This has been overcome in two ways; either by the use of platinum later on, or operating in connection with the chamber plant, in which the waste gases could be finally recovered.

The contact process has certainly come to stay. The revolutionizing of the sulphuric acid industry by its means is proceeding slowly and uniformly; the advantages though great, not being sufficient to warrant the scrapping of the chamber plants already in existence.

Some cinder, especially that obtained from the roasting of Rio Tinto ores, is low enough in sulphur to admit of being used along with iron ore in blast furnace work. The cinder, however, resulting from native ores is largely waste product, but, certain amounts are used in connection with the mineral paint industry.⁹ The cinder is ground and then heated in retorts until the exact degree of oxidation is effected to obtain the desired color. This is largely used in the manufacture of paper, where a red color is desired, and also as an adulterant in paint manufacture.

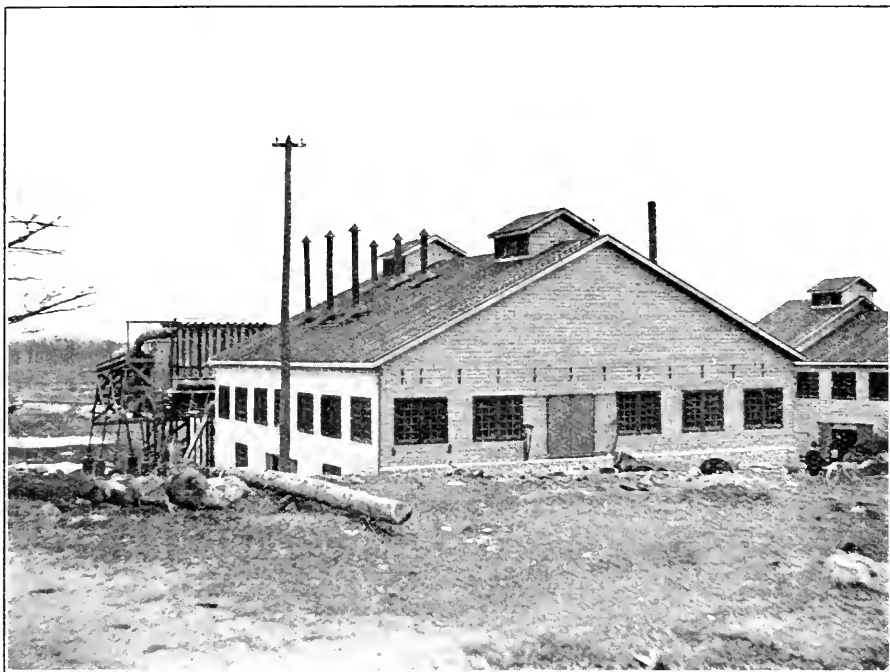
A New Industry for Ontario

Although references are frequent in the Geology of Canada and the Reports of the Bureau of Mines, to the uses of sulphuric acid, and the value of this industry to a country, no move along those lines until recently has been made in Ontario since the days of the old Brockville failure. In The Journal of the Canadian Mining Institute, 1902, page 148, Dr. W. L. Goodwin states: "We have some of the largest and best deposits of pyrite to be found anywhere in the world. One of these is now being worked, and the raw pyrite is shipped to the United States for the manufacture of sulphuric acid, etc. We import the acid for the manufacture of nitro-glycerine, etc. The pyrite is worth \$3.00 or \$4.00 a ton. Each ton will about make 1½ tons of acid, worth \$40.00. It would certainly be of great advantage to make our own acid, and even make it for

⁹Journal of The Canadian Mining Institute, 1903; C. A. Meissner on the Manufacture of Sulphuric Acid at Sydney, C.B.

export. If this were once begun, it would be the basis for a dozen other chemical manufactures, in which sulphuric and sulphurous acids are used."

In the fall of 1906, however, The Nichols Chemical Company of Canada, operating the Hungerford mine, commenced the building of a large acid plant, which they have located on a level piece of ground lying between the mine and the Canadian Pacific railway. Some idea of the large extent of the building operations can be formed from the illustrations. The works have since then been completed and put in operation. Some five carloads of pyrites per day are used in the manufacture of sulphuric, nitric and mixed acids. These products are shipped to all parts of Ontario and Quebec in the company's own tank cars. The contact process of manufacture is employed, the installation of which is made expensive by the large quantity of platinum required. The employees in the works and mine number over 150, the monthly pay-list being upwards of \$6,000. The works are situated at the new station of Sulphide, where a thriving village is springing up composed almost entirely of the company's employees.



Burning room, Nichols Chemical Coy., Sulphide.

Uses for the Acid

The oil production of Western Ontario is constantly increasing, and the importations of crude oil also must continue to increase with increase in our population and the consuming capacity of our people.

The extension of our railroads, and the construction of large public works, canals, etc., require an ever increasing consumption of dynamite, etc., and steadily growing demand may be looked for.

The continuous expansion of the fruit and canning industries inevitably cause a more extensive use of fertilizers; also when we consider that farming lands in the older portions of Ontario have been steadily cropped for over eighty years, notwithstanding the increase of mixed farming due to the cheese and dairy industry there is no question



Mine shaft.

Sulphur burners.

Chambers.

Nichols Chemical Company's acid works, Sulphide.

Contact plant.

Power House.

Nitric acid plant.

Acid Storage tanks.

that the use of fertilizer in this Province could be widely extended. It is to a large degree a matter of education as to its value. Although in the United States the tobacco and cotton industry produce the largest demand for fertilizer, yet in the eastern section of that country, its use is practically universal. This has been due largely to the campaign of education instituted by the Federal and State governments, and by the fertilizer interests. It is reasonable to suppose that the same causes would produce an extensive demand for fertilizer in this Province, especially when it is considered that we have high grade phosphate and pyrite deposits, constituting the two main raw materials, almost along side of each other. An analysis of other sources of consumption in this Province indicates that no falling off in the demand may be anticipated, but on the other hand, there is bound to be a continuous increase in the consumption of sulphuric acid. By importing anthracene (a by-product of the coking of Nova Scotia and British Columbia coal) there is no reason why the aniline dye and other allied manufactures could not eventually be undertaken in this Province.

The alum industry is one deserving of attention, and to produce neutral or basic sulphate of alumina, 1,250 lb. of bauxite are used to 2,800 lb. of sulphuric acid of 50° Be.

The most promising field, however, for the use of iron pyrites within the Province is in connection with the sulphite pulp industry. Extensive plants of this kind are situated at Ottawa, Hawkesbury, in the Niagara peninsula, at Sturgeon Falls, Spanish River, etc. These companies manufacture their own by-sulphite liquor, using brimstone as the raw material. This brimstone is imported from Sicily, and costs on an average from \$25 to \$26 per ton laid down at the works. Roughly speaking, an average of 160 lb. of sulphur is required per hundred thousand pounds of sulphite pulp. Other plants, which are able to obtain their sulphur (on account of less freight rate) much more cheaply than the Ontario plants, are finding it more economical to use iron pyrites instead of brimstone. Eight years ago The Partington Paper Pulp Company of Dartford on the Kent equipped its Norwegian mill with pyrite burner apparatus, and many other European mills have since that time followed its example. In 1901 one sulphite mill in the United States was using pyrite, and since that time several others have followed suit, especially in the New England States. It is estimated by F. J. Falding that suitable pyrite for wood pulp manufacture would induce an economy of 75 cents to \$1.00 per ton of pulp produced, and the farther from the seaboard the works were situated, the greater would be the saving. Take the example of a mill located in Eastern Ontario, which is now using 12 tons of sulphur per day in the midst of a pyrite-producing district. At the price of \$25 per ton, sulphur is now costing them \$300 per day. Equivalent to that amount of sulphur in a 40 per cent. ore would be $2\frac{1}{2}$ tons of pyrite per ton of sulphur, or 30 tons per day. This could be laid down at the works say at \$6 a ton or \$180 per day, thus effecting a saving at this one plant alone of \$120 per day by using pyrite instead of brimstone. Nothing is allowed for the little remnant of sulphur that will remain in the cinder, or for the slightly increased cost of handling, because these items would be more than compensated by the sale of the cinder.

No apprehension need be felt that sulphur production might increase to such an extent as to drive pyrite out of the market. The whole tendency of the two trades has been in the opposite direction. During the past twenty years a certain amount of sulphur each year, especially on this continent, has been replaced by pyrite. Brimstone cannot possibly compete with pyrite until it is laid down at points of consumption at \$14 a ton, and there is no prospect that crude sulphur will ever be any cheaper than it now is. For many years the sulphur industry was dominated by the Anglo-Sicilian Corporation. In the last couple of years, however, Florida not only became a factor in the market, but is practically able to dictate terms, especially as far as the United States is concerned. This condition of affairs has been rendered possible by the success of the ingenious Frasch process. By this a well is drilled and then cased with an iron

pipe 10 inches in diameter. This enters the rock overlying the sulphur a distance of ten feet. Inside is a pipe 6 inches in diameter, and inside of that one 3 inches in diameter, and inside of this again one of 1 inch diameter. The well is carried down to the bottom of the sulphur pit, and the small pipes dropped nearly to the bottom of the hole. Water heated to 320° F. is forced down the 10-inch and 6-inch pipes and compressed air down the 1-inch pipe. A column of sulphur rises with great rapidity. The success of this process caused such a state of alarm in its competitor that the Anglo-Sicilian Corporation has been practically disbanded, and the regulation of the Sicilian sulphur industry taken over by the Italian government.

Of the sulphuric acid works in Canada, one at Sydney, C. B., uses Newfoundland iron pyrites; one at Capetown, Que., uses cupreous iron pyrites from that locality; and one at Vancouver, B.C., uses Japanese sulphur, which doubtless acid plants along the Pacific Coast will find it advantageous to use as raw material in the absence of pyrite deposits close at hand. Brimstone is still being used in small amounts in Ontario, at Smith's Falls and London, and to a considerable amount in the sulphite pulp industry, but notwithstanding the price to which brimstone at some future time might possibly be reduced, freight rates will always be a prohibitive economic factor in its competition with Ontario pyrite.

Availability of Pyrrhotite

Several years ago in the United States W. H. Adams foresaw that by exhaustion of pyrite deposits, pyrrhotite would have to be called in as a source of sulphur. One of the pioneers in this movement was The Lake Superior Corporation at Sault Ste. Marie, Ont. As no roaster had ever been designed for pyrrhotite, the Herreshoff furnace was changed to meet the differing conditions. The main alteration was in the regulation of the draft, so that the requisite amount of oxygen, and no more, might be supplied to the roasting hearths. It is stated by E. A. Sjostedt in the *Journal of the Canadian Mining Institute*, 1904, page 486, that a pyrrhotite ore as low as 20 to 25 per cent. in sulphur was found to be free-burning in the roaster used, and cinder produced as low as .20 to .75 per cent. in sulphur without obtaining a weak gas, but generally the amount was from 1 to 3 per cent. sulphur when not producing a good gas. Since this time the use of pyrrhotite in the southeastern States has become quite extensive.

The occurrences of pyrrhotite in Ontario, as given by W. G. Miller in the Report of the Bureau of Mines for 1900, page 207, are: "Dalhousie, lot 22, con. 2; lot 18, con. 3; Elizabethtown, lot 19, con. 2; Galway; Monteagle; Madoc, lot 19, con. 2; Olden; Wollaston, lot 15, con. 2, lot 22, con. 9." Other deposits are situated in Frontenac county near Mountain Grove; in Hastings county near Turriff and along the Hastings road above Millbridge, and in Haliburton county, more particularly in the townships of Galway and Glamorgan. From an economic standpoint, these deposits being non-nickeliferous their only possible use is in the acid industry.

The day, however, is far distant when recourse to pyrrhotite will be necessary on account of the exhaustion of the iron pyrites deposits of Ontario. Owing to the vast extent of undeveloped and even unexplored territory, and the comparative slowness in providing transportation facilities, it is highly probable that the acid industry will draw from large well situated pyrrhotite deposits, while many remote pyrite deposits remain untouched. It is also probable, that with the ever increasing demand in the country for sulphuric acid, the problem of saving the roast heap gases of the nickel industry will be successfully solved, and an obnoxious waste converted into a financial asset for the companies interested and the whole Province.

Production of Pyrite in Ontario

The Reports of the Bureau of Mines give the production of iron pyrites, 1901 to 1906, as follows:

Year	Tons	Value
1901	7,000	\$17,500
1902	4,371	14,993
1903	7,469	21,693
1904	13,451	43,716
1905	7,325	21,885
1906	11,090	40,583

The production for 1901 consisted largely of ore won from the open pit at the Bannockburn mine. The falling off in 1902 is to be attributed to development, the result of which is seen in the increased production of 1903. The robbing of the Bannockburn mine and the opening up of the Hungerford were responsible for the further increase in 1904. The decrease in the following year was due to the suspension of operations at the Hungerford mine, while the production of 1906 included output from the Helen mine and Rib lake deposits as well as those in Hastings county.

Although the coming years will undoubtedly show a steady increase in production, much time for systematic development of the deposits on the one hand, and transportation facilities on the other, will have to elapse before the output approaches anything like the amount justified by the character and extent of the Province's resources.

While it is true that the ordinary mining property presents some risk in the prospective stage, it is also true that the quality and grade of a pyrite deposit can be definitely ascertained, the cost of production, transportation and price of the ore accurately predicated, and the possibility of failure practically eliminated. The allurements for the general public of the mining of the precious metals is such that other and safer forms of mining investment are apt to be overlooked. The statement that none but countries rise to great material prosperity where the balance between mining and agriculture is evenly maintained, is only true if the products mined form the raw material for great metallurgical and manufacturing industries. This is the condition which should obtain in Ontario, and the capital which will enlist the best engineering skill in winning and working up these latent supplies of raw material, will not only reap a sure reward, but greatly contribute to the welfare of the Province as a whole.

The writer desires to extend his thanks to the many mine owners and superintendents for kindly hospitality extended, and also gratefully acknowledges assistance from many others in the preparation of this report.

THE LARDER LAKE DISTRICT

BY R W BROCK

NOTE.—This report is based on field work which occupied about two weeks' time. The rocks have not yet been subjected to microscopical or laboratory examination. Consequently, the report must be considered tentative and subject to revision.—R.W.B.

Situation and Means of Access

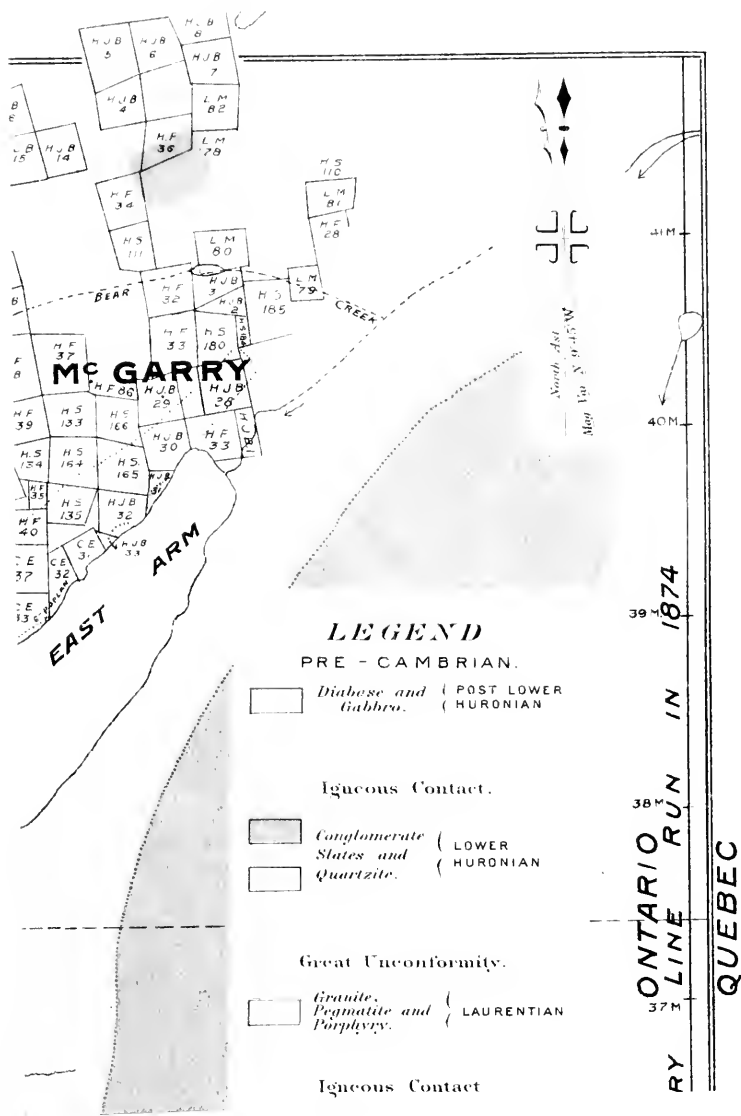
Larder lake lies about 34 miles north of the head of lake Temiskaming, two and a half to three and a half miles west of the inter-Provincial Boundary Line between Ontario and Quebec, and a few miles south of the height of land separating the Ottawa and St. Lawrence waters from those flowing northward to James Bay. The location of the corner posts of the townships of McGarry, McFadden, Hearst and McVittie would fall in the main body of the lake near the north shore, so that the northeast arm lies in McGarry, the southeast in McFadden and most of the western part of the lake in Hearst.



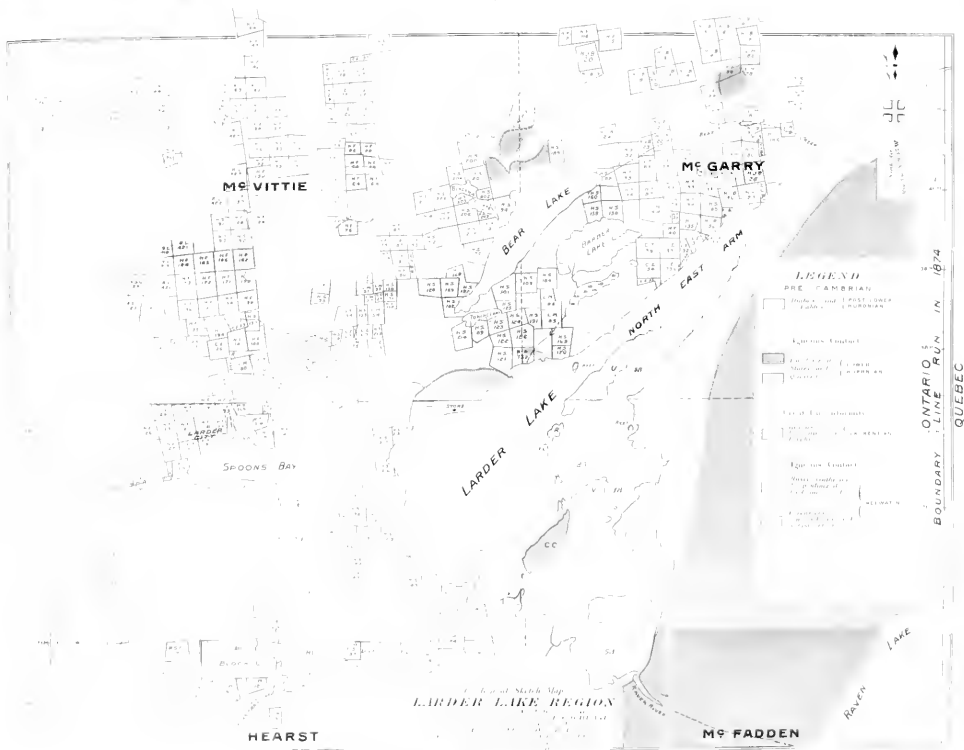
Typical view of country about Larder lake. The hills in the background form the divide between Larder lake and Raven lake.

Access to the lake may be had by several routes. Those most frequently followed are via Tomstown, on the Blanche river, which may be reached from Haileybury and New Liskeard either by steamer up the Blanche river, a twice-a-day service, or by daily train to Heaslip, a station on the Temiskaming and Northern Ontario railway, two and three-quarter miles by wagon road from Tomstown.

From Tomstown a canoe route or a wagon road may be taken. The river from Tomstown to Wendigo lake on the east or Abitibi branch of the Blanche is swift, and three portages are necessary, the last one being a mile and a half long, so that the best part of a day is taken in covering this distance. As it is only about seven miles by wagon road to Wendigo, this is usually made the starting point for the canoe journey. This canoe route leads northeastward through the Wendigo lakes and a connected chain



The country about Larder lake is on the whole of low relief, having the typical glaciated form of the Laurentian peneplain. Its surface is uneven, being broken by depressions occupied by lakes and muskegs, by knolls of sand or gravel, and by protruding



of eight small lakes to Raven lake, across the south end of Raven lake to Larder creek and up the creek to Larder lake. This route can be easily followed and the portages are short and light. The only portages of any length are the one into Raven lake and the one from Raven lake, round the falls of Larder creek. These two are each about one-third of a mile long. The trip from Wendigo to Larder can be made in a day, and at present this forms the best summer route for travellers and supplies.

There is also a wagon road from Wendigo to Larder lake. A little beyond the half-way house this road forks, the west branch followed by the telephone line running to Spoon's bay, and the east branch connecting with Fitzpatrick's bay, about sixteen or seventeen miles from Wendigo.

While a good route in winter, and not too difficult for foot passengers at any time, the wagon road is next to impassable for horses at the Larder lake end except during the winter season. A trail runs from Boston on the Temiskaming and Northern Ontario railway to Larder Lake city, a distance of about twenty miles. A good wagon road is now under construction by the Government between these two points, which when completed will afford the readiest means of transportation into Larder lake.

The first exploration of Larder lake was by Prof. W. G. Miller, now Provincial Geologist, who in 1901 made a reconnaissance survey of the Blanche river, in search of iron ore formations. He ascended the Abitibi branch and crossed Larder lake or Present lake, as it was then called. In his report, published in the Report of the Bureau of Mines, 1902, he called the attention of prospectors to the mineral possibilities of the region.

In 1904, after the discoveries at Cobalt, W. A. Parks made a geological survey of this portion of the country for the Geological Survey of Canada. His report was published in the Summary Report of the Geological Survey for 1904. The main object of this survey was the delimitation, north of lake Temiskaming, of the rock formation which at Cobalt had been proved to be silver bearing. He notes the discovery of gold during the summer, along the chain of lakes between Wendigo and Raven lakes, and expresses the opinion that this region is worth prospecting for gold.

Discovery of Gold

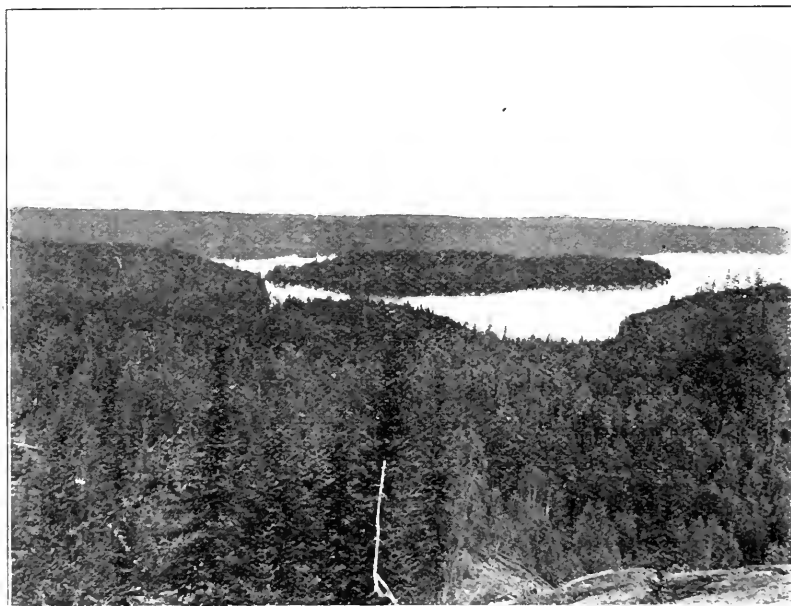
During the summer of 1906, the great demand for mining property in northern Ontario, created by the Cobalt boom, caused prospectors to extend their operations far beyond the limits of the Cobalt field, and a number of parties found their way into Larder lake. It is said that gold had long been known to occur at Larder lake by an Indian, Tonene, in whose hunting ground the lake lies, and that when prospectors began to approach his territory he located the first claim, thereby attracting their attention to this as a gold district. The writer has not verified this story. Before the end of the season a number of prospectors had staked claims on the lake which furnished good specimens of free gold. The samples which they brought down at the end of the season caused a winter stampede to Larder lake, and practically all the ground in its vicinity and for some miles north was speedily staked. Something like four thousand claims were recorded. Necessarily a large number of them were snow-stakings of doubtful value. Companies were formed during the winter, to prospect and develop Larder lake claims, but only a portion of the necessary supplies reached Larder lake before the break up of the winter road, and since then it has been impossible to get them in so that little development work that would prove the value of a property has been done or may be done this season.

Topography

The country about Larder lake is on the whole of low relief, having the typical glaciated form of the Laurentian peneplain. Its surface is uneven, being broken by depressions occupied by lakes and muskegs, by knolls of sand or gravel, and by protruding

knees or elbows of rocks. The skyline, viewed from the higher hills, is very regular and even, but is occasionally notched by a valley or by a monadnock hill of more resistant rock. Along the southeast and east of the lake, a range of hills rising 500 or 600 feet above the lake, separates Raven lake valley from that of Larder lake. At the north end of this range, cut off from it by a pass, is an isolated, mesa-like hill, called Shiminis.¹ This hill has an elevation of about 750 feet above Larder lake, and is about three miles from the head of the northeast arm. It forms the most striking object in the topography of this region.

The lake in many respects resembles Temagami on a small scale, with its arms and numerous islands. As a rule the shores are rocky, often steep, and in a few places rise abruptly as cliffs. High cliff faces, both round the lake and on the hills away from the lake, are almost invariably formed by vertical joint planes in the conglomerate formation, which will usually be found on the higher elevations. The average of barometer readings for June gives an elevation of about 1,100 feet for the lake. The shores reach an extreme height, at the head of Fitzpatrick's bay, of 200 feet above the lake. The



Larder lake, looking north from Fitzpatrick's bay.

depth of the basin occupied by the lake could not be determined, as there was no means of estimating the extent to which it had been filled with silt. The deepest sounding obtained was in the narrows where the depth was 94 feet. Other soundings are shown on the accompanying map.

Geology

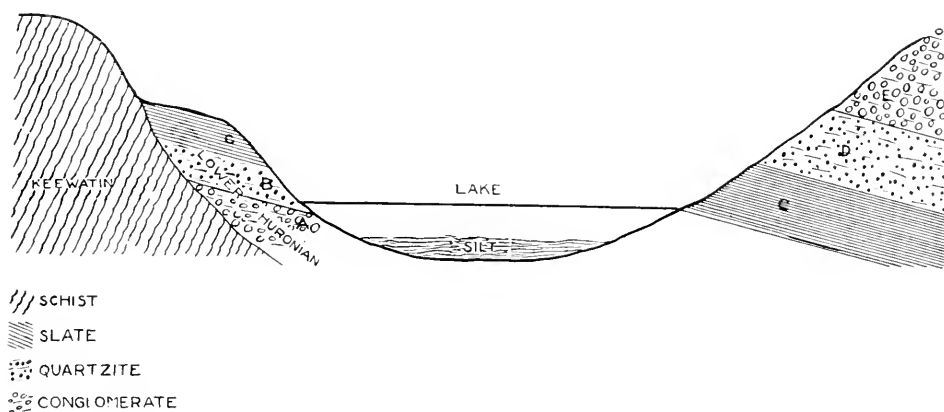
The rocks of the district present considerable variety. While a good deal of the territory is covered with drift—and contacts between the various rocks are particularly liable to be covered with this recent, unconsolidated material—the relationships between the chief groups of rocks may be determined with considerable certainty. An inspection of their general characteristics without consideration of the relationships exhibited

¹See 11th Rep. Bur. Min., 1901, pp. 218, 219.

leads naturally to a subdivision of the rocks into several formations. A similar subdivision into the same groups is arrived at by classifying them according to their relationships to one another.

West and north of the lake is a complex, consisting of phyllites, schists, cherts, ferruginous dolomites and greenstones, cut by igneous rocks. These rocks as a rule are lying on edge and are characterized by the disturbances and metamorphism to which they have been subjected. Cutting them at various points about the lake are pegmatite and quartz porphyry dikes, evidently connected with a granite intrusion. From the number of granite boulders scattered over the surface, it is evident that not very far away the granite is exposed. While later than the rocks of the complex, the rocks of the granite family are undoubtedly older than the sedimentary rocks mentioned below as overlying the old complex, since these sedimentaries contain fragments of the granites.

Lying unconformably upon the preceding complex is a series of sedimentary rocks consisting of slates, quartzites and conglomerates. These are for the most part undisturbed, with gentle dips, except in the immediate vicinity of a later igneous intrusion, where they may show considerable local metamorphism. In such cases differentiation from the earlier complex may be somewhat difficult, but the undisturbed condition of these rocks affords the readiest criterion for their recognition. This series is exposed on most of the islands of the main body of the lake, on the north shore near the narrows, and on the east shore of the lake.



Ideal section showing relationship of rocks on Northeast Arm of Larder Lake.

Later than and intrusive in the rocks above mentioned, is an igneous rock which in places presents a gabbro facies, and in others a diabase, and also a series of usually small, basic, mica dikes.

The rocks of the basal complex correspond perfectly, in position and in lithological character, in their disturbed and metamorphosed condition, to the oldest formation in the lake Superior and lake Huron districts, which the International Committee on Geological Nomenclature recommended should be called Keewatin. The rocks of the granite family correspond to the Laurentian as defined by this Committee, and the sedimentary series to the Lower Huronian. As no rocks newer than the diabase or gabbro were seen, it can be classified only as Post-Lower Huronian.

Above the solid formations are glacial and post-glacial deposits of clay, sand and gravel. There are, then, in descending order the following formations:

Name.	Rocks.
POST-GLACIAL	Clays, sands, gravels.
GLACIAL	Boulder clay.
GREAT UNCONFORMITY.	
POST-LOWER HURONIAN	Diabase, gabbro, mica lamprophyres.
IGNEOUS UNCONFORMITY.	
LOWER HURONIAN	Conglomerate, quartzite, slate.
UNCONFORMITY.	
LAURENTIAN	Granite, pegmatite, porphyry.
IGNEOUS UNCONFORMITY.	
KEEWATIN	Greenstone, lime silicate rocks, schists, dolomites, cherts, etc.

It will be noted that the rocks here bear a strong resemblance to those at Cobalt, the chief differences being that none of the upper members of the Huronian are represented, but on the other hand the Keewatin contains a more varied assemblage of rocks.



Keewatin "greenstone," which may represent altered limestone. The dark portions are green lime-silicate minerals; the light are calcite. Pancake creek trail.

It is interesting to find at such widely separated points as lake Superior, lake Huron, Cobalt, and the Height of Land, the same rocks, showing the same relationships, falling into the same scheme of classification; thus confirming the idea that the rocks as grouped represent great and widespread systems, separated by profound alterations of geological conditions during great time intervals.

Keewatin

The Keewatin, as above noted, consists of a complex group of rocks of both igneous and sedimentary origin, highly disturbed and metamorphosed. Possibly the commonest rock is a green chlorite schist, which probably represents an old, squeezed, eruptive

rock. Sometimes this is thinly fissile, and sometimes rather massive. Hornblende schists are rather common. A soft grayish-weathering schist with green chloritic seams is also of frequent occurrence. These schists are often charged with pyrite in well formed cubic crystals.

Bands of soft micaceous schists, phyllites or slaty rocks, and a rusty weathering dolomite (?) are in places conspicuous members of the series. With the latter rock on Pancake creek is a thinly banded chert, like the jasper bands of the Iron ore formation. A banded green and white cherty rock on the east shore of Fitzpatrick's bay, also bears a strong resemblance to Keewatin Iron ore formation, a resemblance strengthened by the folding and faulting to which it had been subjected. From the number of its boulders in the Huronian conglomerate, typical banded red jasper and magnetite iron ore must occur near here, possibly buried under the Huronian. It is exposed in the township of Boston to the west.

Greenstones, some highly altered, and some showing original textures, cut the older rocks of the system. These greenstones often exhibit the typical spheroidal markings, torsion cracks, quartz and calcite seams that characterize the Keewatin in the Cobalt and Lake Superior districts. On the southeast corner of Fitzpatrick's bay, near the point west of the Golden Thorn, and on Haycock hill where Brunné's trail to Boston turns west round the bend of Pancake creek, is a rock consisting of boulder-like masses of green, calcium-magnesium-iron silicate, cemented by crystalline calcite. All stages from this pseudo-conglomerate to massive green-silicate rock with seams of calcite occupying gashes like torsion cracks, are to be found. The green silicate rocks present the characteristics of typical Keewatin greenstone. Where the rock consists of boulder-like masses of silicate in calcite, it bears a strong resemblance to a limestone partially altered to green silicate rock by contact metamorphism, and the massive greenstone to the more completely altered limestone. The numerous old intrusive rocks in the Keewatin would account for the metamorphism.

While it would require more detailed work to establish the truth of this hypothesis, there are several facts which make it quite possible that some of the Keewatin "greenstones" may have had this origin, although the majority of the greenstones, without doubt are altered eruptive rocks. The Keewatin certainly contains a considerable amount of sedimentary material which must have been metamorphosed by the extraordinarily numerous intrusions of igneous rocks. Limestones or feriferous dolomites are included in these sedimentaries, and would be expected to be altered to green silicates. This would explain the remarkable richness in lime-carbonate which some of the Keewatin "greenstone" has been shown to possess.

The Gold-bearing Rock

The most interesting rock from an economic standpoint near Larder lake is the rusty weathering dolomite (?). About 60 per cent. of the rock consists of lime-magnesian-iron carbonate, the remainder of quartz and a soft green talcose silicate, probably serpentine. The origin of the rock is as yet a little uncertain. Certain dikes, when squeezed and altered, produce a rock which bears a strong resemblance to it, but its occurrence with slates and phyllites and with the cherts—undoubted sedimentary rocks—as a conformable band with them, over a wide stretch of country, and its apparent composition, render it much more probable that it is an altered, stratified, feriferous dolomite, probably forming a member of the Iron Ore formation. This rock, especially where cut by the porphyry or pegmatite mentioned in the Laurentian on a later page, is traversed by innumerable stringers of quartz which in places are gold-bearing. This rock was seen northeast of Reddick's at the head of the Northeast arm, extending southwest, about parallel to the arm, to about the Proprietary Company, where it gets back a short distance from the lake, past Bear and Tonene lakes, Pancake creek,

Bluebell and Maxwell claims, north of Larder City and around Pancake lake. A similar band seems to occur south of Spoon's bay, and at one or two points on Fitzpatrick's bay. The Keewatin rocks are folded, contorted and faulted. They are generally on edge. That this represents the true dip, and not merely schistosity, is shown by the succession of sedimentary bands on going across the strike.

The Keewatin rocks form the oldest and most disturbed formation at present recognized. These rocks were formed during a very extended portion of geological time and under changing geological conditions. It is more than probable that this series should be subdivided into several formations, for some of the rocks are very much newer than others and have been subjected to much less alteration. Some disturbed and squeezed conglomerates intimately related to the Keewatin, as on the west shore of the main lake about a mile below the narrows, seem to belong to this formation, and if so mark unconformities which might be utilized to subdivide the Keewatin. The subdivision is rendered difficult, however, by the degree of metamorphism, and the disturbances through igneous intrusions.



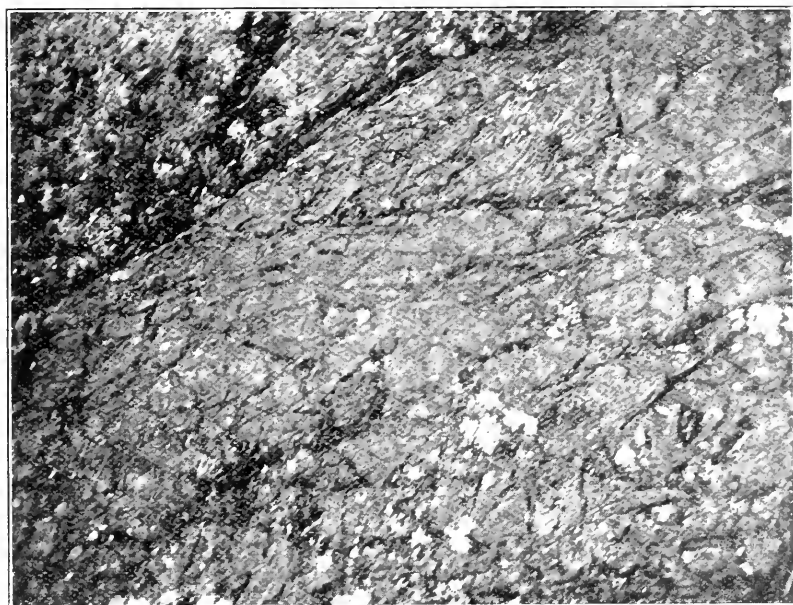
Serpentinized and silicified dolomite (?), dissected by quartz stringers. Bluebell claim.

The Keewatin is not only cut by eruptives belonging to this period, but by later intrusions as well. As will be shown below, mineralization on an extensive scale took place during Keewatin times.

A long time interval elapsed between the Keewatin and Lower Huronian during which the Keewatin was a land surface subjected to heavy erosion. This erosion produced a topography not unlike that of this country at the present day. Some of the old Keewatin valleys are now present-day valleys, as the northeast arm of Larder lake, which, as the contact between the Keewatin and Lower Huronian shows, was a valley at the close of the Keewatin. Erosion and transportation must then have greatly exceeded atmospheric weathering, for the Keewatin surfaces and hills were swept bare of rotted rock before the Huronian was deposited on them.



Keewatin greenstone with torsion-like cracks, left by the weathering out of calcite. Pancake creek trail.

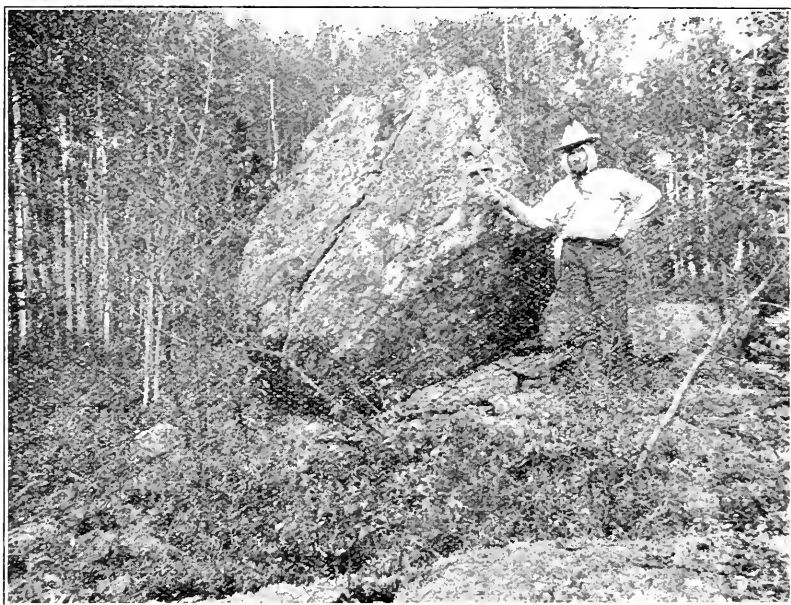


Spheroidal markings on metamorphosed Keewatin near Golden Thorn, north shore of Larder lake.

Laurentian

Included in this formation are the pre-Huronian granites, and related rocks, which are intrusive in and therefore later than the Keewatin, but which antedate the Huronian. In many places in Ontario these rocks cover large areas. Often they have been mashed to gneisses. Around Larder lake, in the areas examined by the writer, the only possible representatives of this formation are the pegmatites and quartz porphyries that cut the Keewatin more or less frequently wherever it is exposed. Erratic boulders of granite are, however, abundant, and similar boulders are held in the Huronian conglomerate, so that it is reasonably certain that pre-Huronian granite occurs in the neighborhood.

The pegmatite dikes are numerous in the Keewatin. The quartz is apt to be segregated, and to contain more or less "mineral" such as pyrite and specularite. The country rock in the neighborhood is apt to be somewhat silicified and mineralized, and occasionally gold is found as in the Gold Hill claim. The pegmatite becomes porphyritic in places, and passes insensibly into porphyry.



Glacial erratic of Huronian conglomerate on the polished upturned edges of Keewatin schist near the narrows, Larder lake.

The porphyries are quartz-bearing rocks with distinct phenocrysts of feldspar. Sometimes the base is reddish and sometimes gray. These porphyries are also associated with mineralization of the neighboring country rock. At the Peerless Mining Company's claims on Fitzpatrick's bay the gray porphyry is mineralized with pyrite, and occurs as fragments in a quartz vein.

The dikes of porphyry are numerous in the Keewatin.

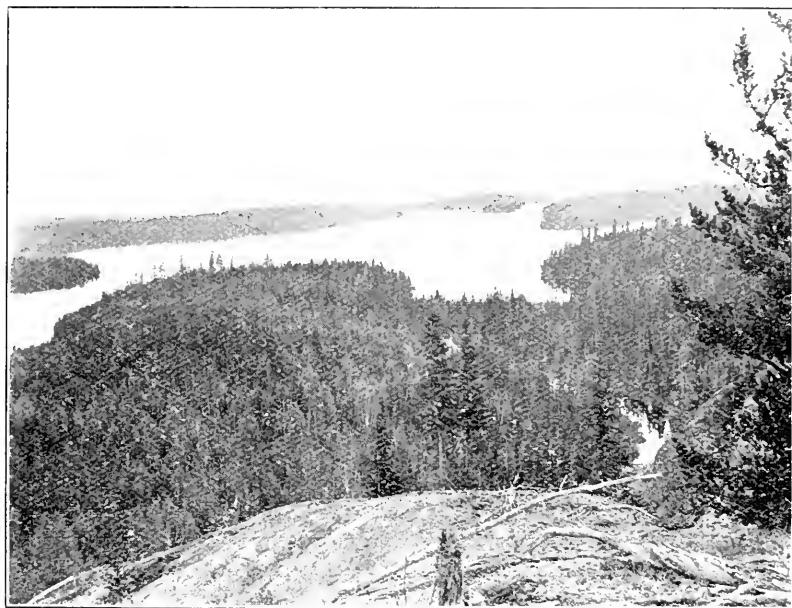
There were extensive disturbances following the Laurentian and previous to the deposition of the Huronian, and the former rocks were eroded extensively before the formation of the latter.

Lower Huronian

On the upturned edges of the Keewatin and Laurentian, eroded into hill and valley, the Lower Huronian rocks were laid down. The actual contact between the Huronian and the Keewatin is usually concealed by drift. At certain points at least, the basal

member of the Lower Huronian appears to be a breccia-conglomerate, carrying angular fragments of the Keewatin rock immediately underlying it, as seen on island CC,² on the small patches of conglomerate left on Gold Hill, and along the shore near the Reddick claims. This rock does not appear to have any considerable thickness. It is succeeded by a thin band of quartzite, and the latter by a considerable thickness of slate. This is again succeeded by quartzite, which becomes coarser and contains a few boulders near its top, and is succeeded by a thick coarse breccia-conglomerate. The thickness of the various members of this group varies at different places. The slates must have a maximum thickness of at least several hundred feet, the quartzites one hundred and twenty-five, and the conglomerate several hundred feet.

The boulders of the conglomerate are rounded to angular, and vary in size from small pebbles to masses 10 or 12 feet in diameter. The great majority are under a foot in diameter. They include all the Keewatin and Laurentian rocks recognized in the district, besides numerous boulders of red and of gray granite, jasper, and finely banded jasper-magnetite—Iron Ore formation.



Fitzpatrick's bay, Larder lake.

Boulders of the Keewatin containing mineralized quartz veins cut off sharply at the edge of the boulder are not infrequent. These veins are mineralized by pyrite, galena, specularite, etc., just as the veins now found in the Keewatin. Boulders of the rusty weathering dolomite (?) with mineralized quartz stringers are among these Keewatin boulders, showing that some of the mineralization of this district dates back to pre-Huronian times.

Certain beds of the conglomerate are apt to be rich in boulders of one kind of rock, and adjoining beds rich in another. The supply of boulders evidently came from alternating sources.

The conditions under which the conglomerate was laid down have not been deciphered. The most obvious explanation is that it is of glacial origin. In this case the basal conglomerate sometimes found, made up of fragments from the immediately

² See map of Larder lake.

underlying Keewatin, would represent uneroded and untransported remnants of the earlier Huronian beds, while the slates, quartzites, and upper conglomerate would represent more or less sorted glacial debris.

Some striated boulders of the conglomerate at Cobalt, found by A. P. Coleman,³ have been taken by him as proof of the glacial origin of the Lower Huronian. The latter evidence, as pointed out by W. G. Miller, is not conclusive, as the rocks at Cobalt have been much disturbed, and some, if not all, of the striations to be seen on the boulders are to be accounted for by these movements, which have slickensided the boulders. Referring to the origin of the Cobalt conglomerate, Miller says,⁴ "In the present state of our knowledge we have little warrant for claiming that the granite boulders, often two or three feet or more in diameter, and distant a couple of miles from exposures of the rock, indicate glacial conditions during Lower Huronian times, although we have no proof to the contrary."



Proprietary Company's camp on Northeast Arm.

The thickness and widespread extent of the conglomerate in northern Ontario, where its general characteristics seem to remain constant throughout, the clean-swept and often rounded surfaces of the older rocks on which it is frequently laid down, and the extraordinary variation in the size of the boulders—these and other facts stated above regarding the conglomerate of Larder lake, furnish the strongest evidence yet found, for a glacial origin. But there are still difficulties in the way of its acceptance. The deposits cannot be said to have the appearance of glacial deposits. There has been no boulder-clay recognized—the material has at least been re-sorted.

Many of the boulders have re-entrants; when polished they have often the form of boulders worn by river sand.

The Huronian is for the most part undisturbed and almost flat-lying. The slates might be expected to contain fossil remains, if animals with hard parts existed in the waters in which these muds were deposited. None, however, were discovered. Where examined, the Huronian rocks appeared to be barren of all trace of mineralization

³19th Annual Meeting, Geological Society of America, New York, Dec. 1906.

⁴Rep. Bur. Min., 1905, Part II. See also Canada Mining Journal, No. 1, Vol. I.

except in places disturbed by later eruptions, where some quartz veins were occasionally developed. In the Cobalt district, however, the Lower Huronian is probably the chief mineral-bearing horizon.

Post=Lower Huronian

At a few points, cutting the older rocks and the Lower Huronian, is an igneous rock which is in places a gabbro, in others a diabase. It is exposed on the north side of "A.A." island; on a reef near the east shore north of this island; on the east shore east of "R" islands; and at the head of Fitzpatrick's bay. In places it is a coarse feldspar-pyroxene or hornblende rock with red feldspar segregations like the diabase near Cobalt. At other places it is fine grained, with small lath-shaped feldspars and a pronounced ophitic structure. At the head of the southeast bay, at the south end of Fitzpatrick's bay, behind the cabin, its contact with the Lower Huronian conglomerate can be traced. The line of contact is irregular, the conglomerate is somewhat altered



Quartz stringers in serpentinized and silicified dolomite (?). Harris-Maxwell group.

along it, while the diabase is finer grained, frozen tightly to the conglomerate, and in places becomes more basic with biotite distinctly developed. Its relationship here suggests a sheet of diabase intrusive between the conglomerate and the Keewatin. In other places it probably breaks up through the Huronian. On the little reef near the east shore north of Island "A.A." the diabase contains a segregation of epidote with a little quartz, calcite and copper pyrites.

Cutting the Keewatin and porphyry are dikes of a basic rock, in which biotite, chlorite and hornblende are now prominent. It has little aplite stringers through it, which, however, may be segregations from its own magma.

Later than these dikes and cutting the Keewatin and Huronian, are dikes of a basic rock which probably represents a biotite-lamprophyre. The basic edge of the diabase resembles them somewhat, and they might possibly be intrusions of the diabase magma.

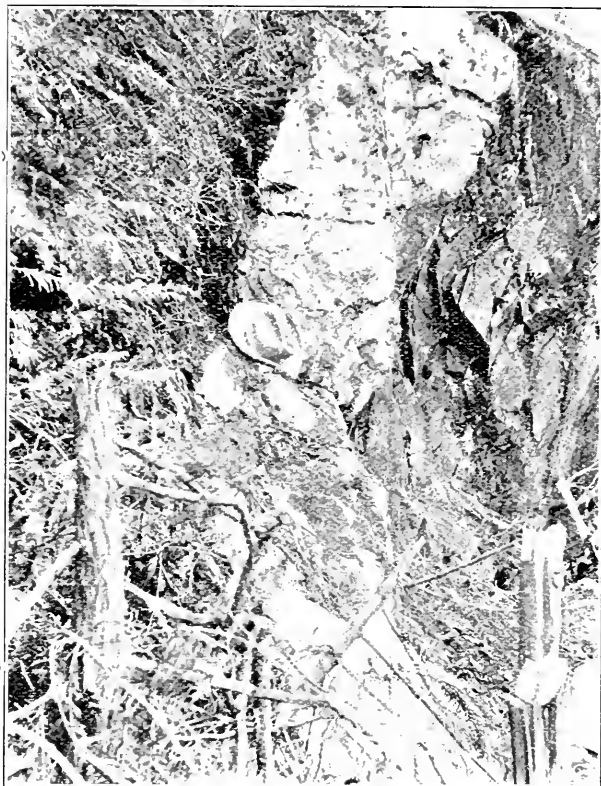
A line of disturbance of some kind extends northward from Larder City. The strike of the rocks differs on either side of this line, and the conglomerate at Larder

⁵ See Map.

City, which contains similar boulders to the ordinary Huronian conglomerate is squeezed almost to a schist. The boulders are drawn out and flattened. The dikes which cut it also show signs of pressure. This probably is a fault line, but as most of the ground about here is drift-covered and muskeg, the exact cause of this disturbance was not ascertained.

Glacial

The exposed rock surfaces are usually rounded, polished, fluted and striated, furnishing evidence of extensive glaciation. Glacial erratics, some very large, are scattered round. The direction of ice movement as recorded by striations averages about 169° astronomic. The local variations from this are very slight. The erratic boulders are



Quartz vein (white) in Keewatin greenstone. The quartz contains a little scattered chalcopyrite, galena, specularite, etc. West side of Fitzpatrick's bay.

much more numerous in hollows and protected places, while those still left on the rock surfaces are generally large, suggesting that these surfaces have since been wave swept. Further evidence of this is afforded by the deposits of sand and gravel which cover large areas, and by deposits of Saugeen clay—a well stratified interbanded sand and clay in one-half-inch to one-inch bands.

The glaciation has cut away the weathered and rotted rock surfaces and scoured the pre-glacial valleys, sweeping away any of the old sands and gravels.

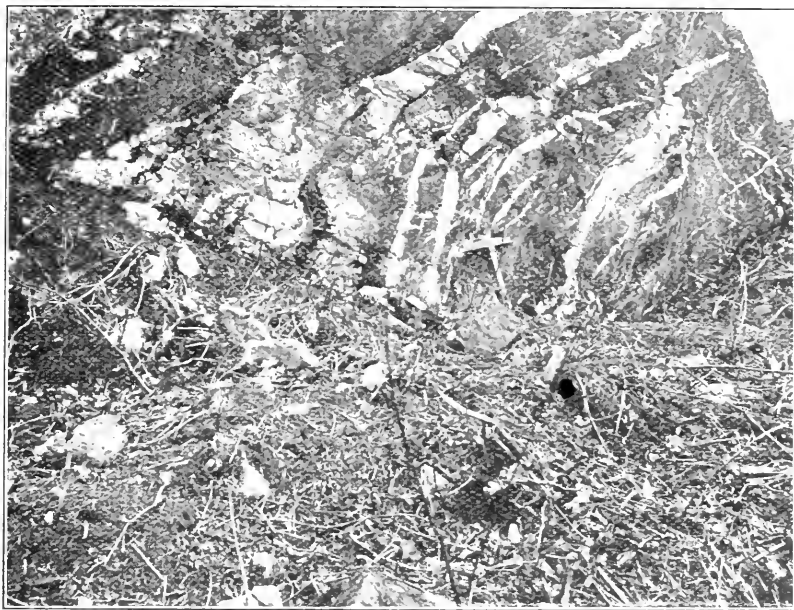
Boulder clay has for the most part been removed by the later water-action, but at one or two protected points a little was believed to occur.

Ores

In the limited time spent in the field only some of the claims could be visited. The claims which were considered locally to give the most promise, and to be typical of the

camp were, however, seen. Most of the "showings" occur in the band of rusty-weathering "dolomite," (?) where seamed with quartz stringers, which is often the case near pegmatite or porphyry dikes, or in the Keewatin greenstone where mineralized with quartz near similar dikes. There are some well defined veins carrying a little pyrite or chalcopyrite, a few specks of galena, and perhaps zinc blende, and in places a good deal of specularite. Sometimes the latter is in rosetted form. Some of the quartz veins are several feet wide swelling out in places to large masses 10 or 12 feet in diameter. The quartz veins seen by the writer looked very lean, and where sampled ran nothing but a trace, except in picked specimens rich in sulphides, which might go a few dollars per ton in gold and silver. Mr. N. L. Bowen, who is continuing the geological mapping reports, however, that since the writer's departure a well defined quartz vein has been found on one of the claims of the Chesterville group, which furnishes good specimens of free gold.

On the Gold Hill claim, which has yielded some fine specimens showing free gold, the country rock is diorite (field name) cut by pegmatite. Stringers of quartz, with some feldspar, from six inches down, in width, traverse the greenstone in the neighbor-



Gold-bearing quartz stringers in serpentinized and silicified dolomite (?).
Reddick group.

hood. The quartz is rather watery in appearance and holds a little copper pyrite, specularite and silicified inclusions of the country rock. A little pyrite is developed in the country rock near by, but very little in the quartz itself. Free gold occurs in places in the quartz, in the silicified inclusions of country rock and in the country rock near the stringers of quartz.

The claims on the silicified band of rusty weathering "dolomite" (?) that show values, have much the same characteristics. The "dolomite" (?) with its peculiar green serpentine mineral developed in bands, is seamed with reticulating quartz stringers from a few inches in width to microscopical dimensions. Some carbonate is often interbedded in the quartz or forms parallel bands with it. The country rock between stringers is frequently silicified to a quartzite-like material. The quartz contains a little pyrite and chalcopyrite, a few specks of galena and perhaps a little specularite. The quartz

stringers are sometimes predominantly parallel to the strike, sometimes predominantly across it, and sometimes quite irregularly distributed. While somewhat rusted on the surface, the oxidation does not usually extend an inch in depth, where the clear unoxidized quartz is encountered. It is sometimes milky white and sometimes somewhat rosy and watery. Through it in places is sprinkled free gold, usually in fine particles, but sometimes in grains the size of a pea or in little plate-like masses.

At the bottom of the two pits on the Knott claim of the Reddick group, about 14 feet below the surface, the gold seems to be as abundant in the fresh quartz in the bottom as near or on the surface. The gold has a fine color and is evidently of a high degree of purity. On the Harris-Maxwell claim a small branching dike of black trap-like material cuts the quartz. The gold occurs in the quartz particularly round galena and near the little black dike. It is also found near the quartz stringers in the silicified country rock.



Open cut on the Maxwell, from which a shipment of 1,500 lb. was made to the School of Mining mill at Kingston, which yielded returns of \$13.20 per ton.

On the Reddick claim two sets of quartz stringers occur running for the most part across the strike. The older set dips about 60° east, and consists of a blue watery barren quartz. The others which have a vertical or slightly westward dip, are of white milky quartz which carries some free gold. They are later than and cut the former set of stringers. These stringers end rather abruptly at the edge of this band against a soft grayish schist. The width of the band of silicified and veined dolomitic rock is not easily determined, as edges are rarely exposed. On the Knott claim at least 100 feet in width is exposed, all veined in much the same way, and, it is claimed, showing gold values for the whole distance. On the Harris-Maxwell the width exposed is still greater, and gold may be obtained at points scattered over this whole exposure.

A shipment from the Harris Maxwell of 1,500 pounds was sent during the winter to the mill at the School of Mining, Kingston. It returned \$13.20 per ton. The hole from which this rock was said to have been taken was 6 or 8 feet across. It is claimed that the greenish silicified rock between the quartz stringers gave assay returns of \$8.00 per ton.

Possibilities

Very little development work has been done, the two fourteen-foot holes in the Knott claim representing the most extensive development in the camp. It has not yet been proved what "run of mine" might be expected from any place. Some of the stringers are quite rich, but they seem to be too small and irregular to be mined by themselves, and it would appear that the whole rock would have to be taken. Over what area such material could profitably be mined and what it would run, can only be satisfactorily determined by mill tests. Several of the companies have ordered small stamp mills, and parts of some of them reached the camp before the spring break-up. Since then it has been impossible to get the complete plants in or to send out trial shipments, so that no such tests have yet been possible. One small mill on the lake run on a custom basis, could probably furnish all the companies the information necessary regarding what might be pay ground, the probable values to be expected, and whether it is desirable to erect a mill on their own properties.



Beginning operations. Clearing for a camp, and building cabins on the Chester-ville group, at head of Northeast Arm.

In many places this band of "dolomite" (?) rock contains very few quartz stringers, and often even when well-cut up by them and otherwise apparently quite promising, samples fairly taken will not yield values sufficiently high to warrant further attention. This rock, however, forms a long continuous band, a little north of the lake, and is exposed at several other places, so that there is a considerable area over which values might be found. On a few claims very fine samples of free gold, nicely disseminated through a considerable extent of rock, have been found. Further prospecting may increase the number of gold "showings." From the character of the quartz and gold, fourteen feet below the surface, it looks as if gold might continue to exist in a free state for some depth. Though the stringers with gold are small and irregular, and therefore make a rich workable ore uncertain, there seems to be a reasonable chance that at some points by mining the whole rock, a large tonnage of low grade ore may be developed, with perhaps occasional rich bunches. If further work and mill tests prove this to be the case, a few dollars per ton in easily won gold (as the gold here so far

seems to be), would constitute good pay ore. With a sufficient tonnage and perfect transportation facilities even three dollars per ton might be made to pay. There are some claims therefore that are worth exploitation along these lines.

As might be expected from the number of "snow-stakings" the majority of the claims have little present or prospective value.

The gold occurrence bears some resemblance to the Lake of the Woods and Rainy River, but here the stringers are for the most part independent of the schistosity, while in Northwest Ontario, the quartz lay between the bands of rock.

It will be noticed that the "showings" so far discovered are all in the Keewatin rocks, and that the main mineralization has been accomplished in pre-Huronian times. The undisturbed Lower Huronian is here, so far as could be seen, absolutely barren. Its only chance would seem to be for an old Huronian placer deposit in the conglomerate, which the mineralized fragments of Keewatin in the conglomerate might seem to suggest as possible. The fact that waste by erosion exceeded atmospheric weathering prior to the deposition of the Huronian, lessens the possibility of such concentration, and the uncertainty regarding the origin of the conglomerate makes it impossible to give a definite answer to the question.

Where the Lower Huronian is disturbed by faulting and large intrusions of the later diabase, it might be mineralized. These are the conditions at Cobalt. The intrusions seen at Larder lake are small and the effects extremely local, but a small amount of mineralization has resulted. It is interesting to find cobalt bloom in a calcite stringer on one of the Chesterville claims at the head of the northeast arm. On Wendigo lake to the south of Larder lake, cobalt has also been found.

There is very little possibility of modern placers being encountered. The loose material and rotted rock surfaces have been removed by the heavy glaciation and scattered somewhere south. Since glacial times very little weathering and consequently very little concentration of gold in sands and gravels, has taken place.

North of Larder lake to Abitibi, the geological conditions appear to be much the same. Gold has been found at Abitibi, and at points between these two lakes, so that a very large extent of territory exists in which to prospect for gold, with fair chance for success.

LAKE ABITIBI GOLD DEPOSITS

BY WILLET G MILLER

There are three areas in northeastern Ontario which have attracted the attention of prospectors for gold during the last two seasons. These are Larder lake, Abitibi lakes and Night Hawk lake. It seems well to have a brief account of the latter two to accompany the report of Prof. Brock on Larder lake.

The writer has not visited Night Hawk lake, but among the specimens shown him, from a small island, known as Golden Island, in the northeast part, by Mr. A. A. Cole, M.E., who examined the deposits for the Temiskaming and Northern Ontario Railway, it is evident that the deposit there being worked for gold is similar to that described by Prof. Brock on some of the mining claims in the vicinity of Larder lake. This material consists of what appears to be a silicified limestone carrying iron pyrites. Associated with the limestone is the somewhat striking green material which Prof. Brock describes as being probably serpentine.

The Abitibi Lakes.

The deposits on the shores and islands of the Lower and Upper Abitibi lakes visited by the writer in August last are different from those described by Prof. Brock and Mr. Cole on Larder and Night Hawk lakes respectively. The chief point of resemblance is that the same green mineral is found in some of the deposits at Abitibi as that in the deposits of the other two lakes.

Mosher Bros. and others did considerable prospecting on the Abitibi lakes in 1906. During last winter a shaft 75 feet in depth was sunk on a vein on a small island, which lies five or six miles north of the north end of the narrows which connects Lower Abitibi lake with the Upper Abitibi lake. The work on this vein in Lower Abitibi lake is the most systematic which has thus far been done on any of the deposits in the vicinity of the lakes. A little work has been done on a deposit in the south bay of the same lake and at a few points elsewhere.

The little island referred to is known as Shaft island, B.C. 173, the head frame of the shaft being visible for some distance. The property is equipped with a fifteen or twenty horse power boiler, a hoist and steam drill. Shaft island is separated by a narrow channel from a somewhat larger island, B.C. 174, which lies to the northward, and on which there is a boarding and sleeping camp, storehouse and an assay office.

The types of gold deposits seen on the Abitibi lakes by the writer are essentially of two kinds: (1) That of Shaft island in Lower Lake Abitibi; (2) Those of the south shore and the islands of Upper Lake Abitibi, from the bay on the south shore on the Quebec side, just east of the Boundary point, to the islands in a bay about four miles S 70° W. of Boundary point on the Ontario side.

The auriferous quartz vein on Shaft island varies in width from about four feet to a few inches. It has a vertical dip with strike east and west and cuts a massive igneous rock which may be called diabase. This rock has a somewhat fresh appearance, and seems to belong to the newer series of eruptives similar to that of the post-Middle-Huronian diabase of the Cobalt area. This Abitibi diabase, like that of Cobalt, carries quartz as a characteristic constituent. Iron pyrites, together with a little copper pyrites and a dark-colored zinc blende occur in the quartz vein. Fine gold is frequently visible in the quartz. The vein cuts across the island for a distance of over 200 feet and disappears into the water on both shores. Our sampling was not very systematic, but it would appear that the vein is workable at a profit with a small plant under good management.

The other deposits visited on lakes Abitibi are different in character from the vein on Shaft island. As already stated, these deposits are found at various points, from the bay on the Quebec side, immediately east of Boundary point, westward along the south shore of the Upper lake. The half dozen deposits examined occur in rocks of

Keewatin age. These rocks here consist essentially of green schists, which are cut by dikes of fine-grained granite or porphyry, varying in width from a few inches to fifteen feet or more. They have been shattered, narrow cracks running across them characteristically transversely from wall to wall. These cracks are filled with quartz, and there are also at times lenses and irregular masses of quartz replacing the dike material or enclosed between it and the wall rock. Fragments of the dikes are frequently cemented by the quartz, forming a breccia. The dike material is, at times, changed to sericite schist. The dikes have been impregnated with iron pyrites, which is now altered, to a considerable extent, to iron oxide. The pyrites appears to be the gold bearer. "Colors" can be obtained by panning the dikes, but the highest fire assays from samples taken by us gave only \$3.40 per ton. Copper pyrites is at times associated with the iron pyrites.

The Abitibi lakes lie 35 or 40 miles north of Larder, while Night Hawk lake lies about 50 miles, a little south of west of Abitibi. It is thus seen that gold has been found over a large area in this part of the Province.

The shortest canoe route to Abitibi is now by way of McDougall Chute station on the Temiskaming and Northern Ontario railway, thence down the Black river to its junction with the Abitibi river, and up the latter to Lower Lake Abitibi. The canoe trip from McDougall Chute to Shaft island can be made in a day and a half. A road is now being cut out from a point south of McDougall Chute to the lake. Supplies for the Transcontinental railway will be taken over it.

On our trip to Abitibi we went across the wagon road from North Temiskaming to Klock's Depot, thence by canoe up the water route on the Quebec side which runs approximately parallel with the interprovincial boundary. Two main series of rocks are seen along this route. From Klock's northward to Island lake just north of the height of land, granite and gneiss outcrops are prominent. On Island lake and northward towards Abitibi, the rocks consist essentially of what appears to be volcanic fragmental material which may be classed as Keewatin. On Upper Lake Abitibi the spheroidal structure so characteristic of Keewatin greenstones was seen well-developed.

Night Hawk Lake

Mr. Cole gives the following notes as the result of his observations:

"Topography: The country surrounding this lake is uniformly low lying, 40 to 50 feet above the lake level being a maximum. There is a heavy clay overburden, and rock exposures are infrequent, and almost always along the water's edge. The bush is green, so that practically all the prospecting done is along the water fronts.

"Geology: The formation is Keewatin, and the rocks are mostly greenstones and old diabase.

"The only location in this section on which much work has been done is on a small island, known as Golden island, situated in the northeast part of the lake. Good cabins are being erected here, two shafts being sunk, and preparations are being made for continuous development during the winter. When I visited this property (6th October, 1907), the working force consisted of thirteen men.

"On this island streaks of white quartz run through a brownish rock resembling a quartzite, but often high in lime in many places, running into bands of calcite usually of a bright green color. These rocks appear to have been derived by alteration from very impure Keewatin limestones. Similar rocks are found in connection with the auriferous deposits of Larder lake. Some pockets rich in gold have been located on this island, and the enclosing rocks show at least a trace of gold.

"The same rock formation that is found on Golden island occurs on the adjacent mainland.

"On account of the heavy clay overburden it will take years to thoroughly prospect this district."

GRENVILLE=HASTINGS UNCONFORMITY

and the

Probable Identity in Age of the Grenville Limestone with the Keewatin Iron Formation of the Lake Superior Region

BY WILLET G. MILLER and CYRIL W. KNIGHT

NOTE.—Since Prof. Brock's paper on the ore deposits of Larder Lake shows that the crystalline limestone or "dolomite," pages 205, 207, is such an important rock in that locality in connection with the occurrence of gold, it has been thought well to publish with his paper, the results of some recently completed work in Southeastern Ontario, which was done chiefly during a few days in November of the present year.

In the Larder Lake area the crystalline limestone is so intermingled with the Keewatin greenstone, owing to the disturbances to which the rocks have been subjected, that it has not been found possible to prove their true relationship. Similar interminglings of carbonate rocks and iron formation with the Keewatin eruptives have been described at various points in Northern Ontario and in the Lake Superior region proper. The writers believe that they have determined by their recent work in Southeastern Ontario the true relationship of the Grenville limestone to the Keewatin, and that this limestone is of similar age to the limestone of Larder Lake and to the limestones and iron ore formation associated with the Keewatin of the Lake Superior region. Owing to the proof of Prof. Brock's paper being in page form before this is written, it is impossible for the writers, without delaying the printers, to give more than an outline of the results of their recent work on the Grenville and associated rocks. A paper containing more details will be published at some later date.

The crystalline limestones and associated pre-Cambrian sedimentary rocks of southeastern Ontario and the adjacent parts of the Province of Quebec, to which Logan and his colleagues long ago gave the names of Grenville and Hastings series, have never been satisfactorily classified as regards their age. In the earlier years of the Canadian Geological Survey the discovery of the supposed remains of an organism, the so-called "cozoon," induced the Survey to place the limestone containing this supposed organism in an arbitrary position. Later workers in re-mapping parts of the area have been no more successful in determining the relationship of these rocks. During the last decade, for instance, the opinion has been emphasized that the Hastings series represented the Grenville in a less highly altered form. Such being the views held by the workers in the field, it is not surprising to find that the International Committee representing the Geological Surveys of the United States and Canada, which made a necessarily hurried trip through the district in 1906, should be unable to arrive at any definite or satisfactory age classification of the rocks of the region under review.¹

Conclusions of Committee of 1906

Concerning the relation of the Hastings series to the Grenville, the Committee say "The term 'Hastings series' in the opinion of the committee should be abandoned as a serial name, seeing that the development to which this name was applied by Logan is merely the Grenville series in a less altered form, as Logan in giving the name had conjectured was probably the case. The committee, however, think that it may in some cases be advantageously employed as a qualifying term to designate the less highly altered phase of the Grenville series, which may thus be referred to as the 'Hastings phase' of the Grenville series."

The Committee say further "The committee consider that it is inadvisable in the present state of our knowledge to attempt any correlation of the Grenville series with the Huronian or Keewatin, so extensively developed in the region of the Great Lakes. The Grenville series has not as yet been found in contact with either of these, and until this has been done and the relations of the several series have been carefully studied, their relative stratigraphical position must remain a mere matter of conjecture."

Referring to the relation of the crystalline limestones and the associated conglomerate, the Committee say "it is, however, still a matter of uncertainty as to whether the conglomerate here developed marks the base of an overlying, infolded, unconform-

¹ Report of a special Committee on the correlation of the pre-Cambrian Rocks of the Adirondack Mountains, the 'Original Laurentian Area' of Canada and Eastern Ontario. Jour. Geol., April-May, 1907.

able series or not." In their classification of the pre-Cambrian rocks of the region, they say "the following succession in this region is therefore recognized and adopted:

"Grenville series

(Intrusive Contact).

"Laurentian."

It will thus be seen that the Committee were able to recognize only two great unconformable series in the region, namely, the sedimentary Grenville and the igneous Laurentian.

The Authors' Conclusions in 1907

Some years ago the present writers, while studying the gold and other deposits of Eastern Ontario, had their attention attracted to the association of the crystalline limestones and the conglomerates (which were frequently found to contain pebbles of limestone) and felt that a brief search would prove the conglomerates to form an unconformable series with the limestones. Pressing work in another region during the last four years has prevented their investigating the problem. A few days in the field during the late autumn of the present year (1907) has, however, made the relationship of these sedimentary series quite plain, and has also shown that an old greenstone series, with associated acidic igneous rocks, similar to that of the Keewatin of the Lake Superior region, is widely developed. They have proved that much, at least, of what has been called the Hastings series, consisting of limestones, conglomerates and other fragmental rocks, is much younger than, and forms a well-defined unconformable series with, the typical crystalline limestones and associated fragmental rocks of what has been called the Grenville series proper. The view that the Grenville and Hastings constitute one series, the former being a more highly altered phase of the latter, is no longer tenable.

Floor of the Grenville

It has also been proved by the present writers that the Keewatin here is the oldest series in the region. The limestones are found to have been deposited on the surface of the Keewatin. An ancient Keewatin lava has, in places, been subjected to little denudation before the deposition of the Grenville limestone, which fills the cracks and openings in theropy surface of the lava. Unconformably above the Grenville limestones and Keewatin lavas or greenstones rest the conglomerates and other sedimentary rocks, including limestones, which the present writers class as Huronian. These conglomerates contain not only ordinary fragments of the Grenville limestones but "cozoon"-like boulders as well, thus showing that the limestone is much older than the conglomerate. Moreover the "pebbles of cherty and ferruginous rocks resembling those found in the iron ranges of Lake Superior" in the conglomerate of Eastern Ontario are found by the writers to have been derived from layers or bands of this material in the Grenville limestone.

Pre-Cambrian Classification

To sum up briefly, the writers find the Keewatin series of the Lake Superior region represented in southeastern Ontario by ancient rocks of like character. The Grenville limestones have been deposited on the surface of the Keewatin. These latter rocks, limestones, are classed as regards age with the Keewatin iron formation of Lake Superior, which it has not been found possible in that region to separate from the greenstones.

The writers classify the pre-Cambrian conglomerate and associated sedimentary rocks overlying, unconformably, the Grenville limestone in Eastern Ontario as Huronian. The crystalline limestones of the adjoining region in Quebec and the Adirondacks appear to be similar in age to those of southeastern Ontario.

The following table show (1) the classification prepared by the International Committee of 1906 for the rocks of Eastern Ontario, Southwestern Quebec and the Adiron.

dacks. (2) The classification adopted by the International Committee of 1904 for the rocks of the Lake Superior Region², and (3) the writers' classification in 1907, for the rocks of southeastern Ontario.

1.	2.	3.
		(Miller & Knight, 1907.)
	Keweenawan.	Keweenawan ? (basic dikes.)
	Huronian.	Huronian.
Grenville.		Grenville.
	Keewatin with iron formation.	Keewatin.
Laurentian.	Laurentian.	Laurentian.

In (1) the Laurentian intrudes the Grenville.

In (2) the Laurentian makes an igneous contact with the Keewatin. In (3) the Laurentian intrudes both the Keewatin and Grenville.

The Huronian in our classification of the rocks of southeastern Ontario stands essentially for what heretofore has been called the Hastings series.

² Report of the Special Committee on the Lake Superior Region. Jour. Geol., Feb.-March, 1905.



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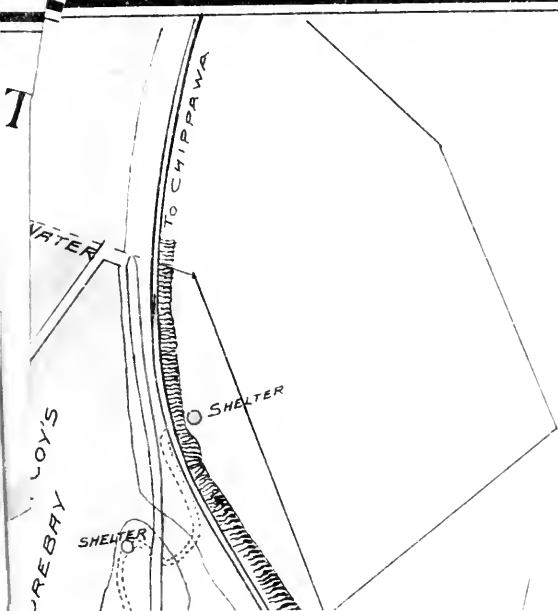
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LOYS
BRY

NEW YORK STATE RESERVATION

EASTERN LIMIT OF LAND UNDER WATER

NIAGARA

RIVER CANON

NIAGARA RIVER
CASCADES AND RAPIDS

DUFFERIN ISLANDS

ALBANY TOWNSHIP

OF STAMFORD



Niagara Falls Feb 1907
James Wilson, Superintendent

Twenty-first Annual Report

OF THE

Commissioners for the

Queen Victoria Niagara Falls Park

1906.

PRINTED BY ORDER OF
THE LEGISLATIVE ASSEMBLY OF ONTARIO



TORONTO:
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1907

COMMISSIONERS OF THE
QUEEN VICTORIA NIAGARA FALLS PARK.

J. W. LANGMUIR, *Chairman.*

GEORGE H. WILKES.

ROBERT JAFFRAY.

P. W. ELLIS.

L. CLARKE RAYMOND.

Superintendent : JAMES WILSON.

Assistant Superintendent : J. HARRISON PEW.

Chief Gardener : RODERIC CAMERON.

PARLIAMENT BUILDINGS,

TORONTO, FEBRUARY 18TH, 1907.

*To the Honorable WM. MORTIMER CLARK, etc., etc., etc., Lieutenant-Governor of
the Province of Ontario.*

MAY IT PLEASE YOUR HONOR:

I beg to submit herewith the Twenty-first Annual Report of the Commissioners for the Queen Victoria Niagara Falls Park, being for the year ended 31st December, 1906.

I have the honor to be,

Your Honor's most obedient servant,

W. J. HANNA,

Provincial Secretary.

TORONTO, FEBRUARY 18TH, 1907.

*Honorable W. J. Hanna, K. C., M. P. P.,
Provincial Secretary, Province of Ontario,
Parliament Buildings, Toronto.*

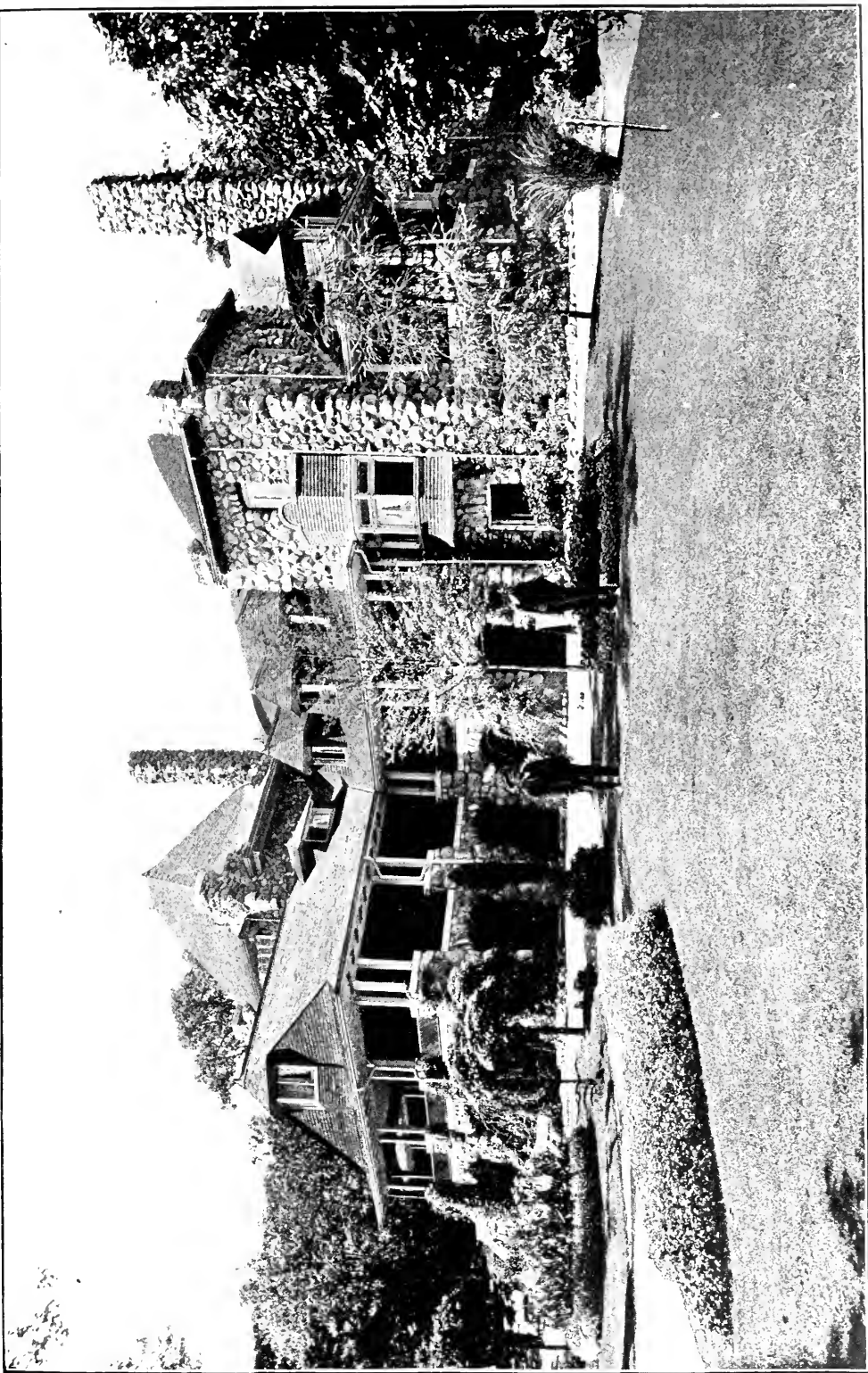
SIR,—I have the honor to transmit herewith for presentation to the Legislature of Ontario the Twenty-first Annual Report of the Commissioners for the Queen Victoria Niagara Falls Park (being for the year ended 31st December, 1906), together with the appendices thereunto attached.

I have the honor, to be, Sir,

Your obedient servant,

J. W. LANGMUIR,
Chairman.

The Shelter and Refectory Building.



TWENTY-FIRST ANNUAL REPORT OF THE COMMISSIONERS FOR THE QUEEN VICTORIA NIAGARA FALLS PARK.

*To the Honourable W. Mortimer Clark, K.C.,
Lieutenant-Governor of the Province of Ontario:*

MAY IT PLEASE YOUR HONOUR:

The Commissioners for the Queen Victoria Niagara Falls Park beg to submit their twenty-first annual report (being for the year 1906), together with the usual statement of receipts and expenditures; the report of the Superintendent on the works of restoration, maintenance and improvement, which have been conducted in the various portions of the park system, and a general reference to the progress made during the year by the several companies engaged in the development of the water power of Niagara Falls for electrical power purposes.

In their last annual report the Commissioners referred at length to the arguments which had been advanced by certain magazine writers, and others in the United States with a view to influencing public sentiment against the use of Niagara River water for the generation of electrical power. The immediate cause of the protest was an application made by a Power Company, on the American side to take from the river, above the located works of the existing power producing companies an exceptionally large quantity of water, estimated by the state officials as equal to about one-sixth of the whole outflow of the river from Lake Erie at mean stages of water level, and practically one-fourth of the flow at periods of low water during storms. This astounding demand had actually received the assent of the State Legislature of New York, and its failure to become law was only due to the exercise of the veto power by the Lieutenant-Governor; which action also served to arouse public interest in the subject, and particularly in directing attention to the fact that in addition to the several corporations now engaged in the production of power, or in the construction of works for that purpose, many charters had been granted on both sides of the boundary line for unlimited rights as to the quantity of water which might be taken from the river above the Falls for the generation of electric or other power.

In view of all these circumstances, which were clearly set out in the report for 1905, the Commissioners recommended that the Governments territorially interested in the river and Falls should without delay cause a full investigation to be made of all the conditions attending the present and prospective utilization of the water power of the Falls for commercial purposes, in order that such action might be taken as would prevent irreparable damage being done to the grandeur and beauty of the twin cataracts.

Up to the present time no active steps have been taken by the companies which obtained charters from the Dominion Government, but which have so far not exercised the rights granted by actual works of construction.

On the American side, however, the subject received very prompt attention. The State Legislature of New York at its Session last spring cancelled no fewer than four of the eight charters which it had granted at various times, in every case for non-fulfilment of charter conditions. By the cancellation of these unused charters there remained four companies under

Legislative authority to take water from the Niagara River on the American side. Two of these being actively engaged in the manufacture and sale of the electricity upon a large scale, and two whose charters had been kept alive by the technical performance of statutory works only. One of them being the company whose extraordinary demands for water has already been alluded to.

As public sentiment on the American side was strongly in favor of still further restricting the taking of water from the Niagara River for power purposes very strong appeals were made to the federal Governments to intervene on the ground that as the Niagara was an international boundary stream, and navigable, it was therefore under the jurisdiction of the central Government.

Largely through the initiative of President Roosevelt an Act was introduced in Congress, and passed by both Houses of Representatives and the Senate in June last, providing for the control and regulation of the waters of the Niagara River, and the preservation of Niagara Falls as well as other purposes. This Act is known as the "Burton Bill" having been promulgated by the Chairman of the Rivers and Harbors Committee of the House of Representatives, and passed under Constitutional authority for the protection of the navigability of streams as well as for natural defence.

That the scope of this important measure may be clearly comprehended the Act is herein incorporated, as follows:

AN ACT

For the Control and Regulation of the Waters of Niagara River, for the Preservation of Niagara Falls, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress Assembled: That the diversion of water, from the Niagara River or its tributaries, in the State of New York, is hereby prohibited, except with the consent of the Secretary of War, as hereinafter authorized in section two of this Act: Provided, That this prohibition shall not be interpreted as forbidding the diversion of the waters of the great lakes or of the Niagara River for sanitary or domestic purposes, or for navigation, the amount of which may be fixed from time to time by the Congress of the United States, or by the Secretary of War of the United States under its direction.

Sec. 2. That the Secretary of War is hereby authorized to grant permits for the diversion of water in the United States from said Niagara River or its tributaries for the creation of power to individuals, companies, or corporations which are now actually producing power from the waters of said river or its tributaries, in the State of New York, or from the Erie Canal; also permits for the transmission of power from the Dominion of Canada into the United States, to companies legally authorized therefor, both for diversion and transmission, as hereinafter stated, but permits for diversion shall be issued only to the individuals, companies or corporations as aforesaid, and only to the amount now actually in use:

Provided, That the Secretary, subject to the provisions of section five of this Act, is hereby authorized to grant revocable permits, from time to time, to such individuals, companies, or corporations, or their assigns, for the diversion of additional amounts of water from the said river or its tributaries to such amount, if any, as in connection with the amount diverted on the Canadian side, shall not injure or interfere with the navigable capacity of said river or its integrity, and proper volume as a boundary stream.

or the scenic grandeur of Niagara Falls; and that the quantity of electrical power which may by permits be allowed to be transmitted from the Dominion of Canada into the United States, shall be one hundred and sixty thousand horsepower: Provided further, That the Secretary, subject to the provisions of section five of this Act may issue revocable permits for the transmission of additional electrical power so generated in Canada, but in no event shall the amount included in such permits, together with the said one hundred and sixty thousand horsepower, and the amount generated and used in Canada, exceed three hundred and fifty thousand horsepower: Provided always, That the provisions herein permitting diversions and fixing the aggregate horsepower herein permitted to be transmitted to the United States, as aforesaid, are intended as a limitation on the authority of the Secretary of War, and shall in no wise be construed as a direction to said Secretary to issue permits, and the Secretary of War shall make regulations preventing or limiting the diversion of water, and the admission of electrical power as herein stated; and the permits for the transmission of electrical power issued by the Secretary of War may specify the persons, companies or corporations by whom the same shall be transmitted, and the persons, companies, or corporations to whom the same shall be delivered.

Sec. 3. That any person, company, or corporation diverting water from the said Niagara River or its tributaries, or transmitting electrical power into the United States from Canada, except as herein stated, or violating any of the provisions of this Act, shall be deemed guilty of a misdemeanor, and on conviction thereof shall be punished by a fine not exceeding two thousand five hundred dollars, nor less than five hundred dollars, or by imprisonment, (or in case of a natural person) not exceeding one year, or by both such punishments, in the discretion of the court. And, further, the removal of any structures or parts of structures erected in violation of this Act, or any construction incidental to or used for such diversion of water or transmission of power as is herein prohibited, as well as any diversion of water or transmission of power in violation hereof, may be enforced or enjoined at the suit of the United States by which any circuit court having jurisdiction in any district in which the same may be located, and proper proceedings to this end may be instituted under the direction of the Attorney-General of the United States.

Sec. 4. That the President of the United States is respectfully requested to open negotiations with the Government of Great Britain for the purpose of effectually providing, by suitable treaty with said Government, for such regulation and control of the waters of Niagara River and its tributaries as will preserve the scenic grandeur of Niagara Falls, and of the rapids in said river.

Sec. 5. That the provisions of this Act shall remain in force for three years from and after date of its passage, at the expiration of which time all permits granted hereunder by the Secretary of War shall terminate unless sooner revoked, and the Secretary of War is hereby authorized to revoke any or all permits granted by him by authority of this Act, and nothing herein contained shall be held to confirm, establish, or confer any rights heretofore claimed or exercised in the diversion of water or the transmission of power.

Sec. 6. That for accomplishing the purposes detailed in this Act the sum of fifty thousand dollars, or so much thereof as may be necessary is hereby appropriated from any moneys in the Treasury not otherwise appropriated.

Sec. 7. That the right to alter, amend, or repeal this Act is hereby expressly reserved."

Under the authority conferred by this Act the Secretary of War for the United States made a personal examination of the works on both sides of the river, and gave a public hearing at Niagara Falls, on the 12th July last to the representatives of the various Power Companies, and others interested in the question. As a result of this examination and hearing, the Secretary of War granted temporary permits authorizing the large Power Companies in active operation on the American side to take water required for operating their works actually constructed. The Secretary of War also granted temporary permits under the terms of the statute recited to the Ontario Power Company, and the Canadian Niagara Power Company, located on the Canadian side of the river, authorizing each to transmit 25,000 electrical horsepower to the American side for the present uses of their United States customers.

On receiving full reports from the engineers designated to examine into all the hydraulic and other conditions involved, the Secretary of War gave a further public hearing at Washington, on the 26th November last, at which the several Ontario Power Companies under license in the Park were represented.

At both hearings before the Secretary of War, the representatives of the American Civic Association took very strong ground against the admission of electric power from the works on the Canadian side. They also made urgent appeals to the members of the Association, and to the American public generally to memorialize the Secretary of War in that behalf; the avowed object of the Association being to compel the Canadian Companies to restrict their output to the requirements of the Canadian market, which was stated in the circular issued to be only 50,000 horsepower. In their efforts to arouse public sentiment respecting the use of Niagara River water for power purposes, the Officers of the American Civic Association in the presentation of their argument greatly overstepped the bounds of reasonable argument, more particularly respecting the effect, the abstraction of water by the development companies on the Canadian side would have on natural conditions.

One of the statements made was that the Ontario Commissioners had already cut off 550 feet of the Horseshoe Fall to accommodate a Power Company. The exact fact being that the continued recession of the Falls, particularly at the center or apex of the Horseshoe Fall had lowered the water at the extremity near Table Rock, thus exposing large masses of unsightly rock, to remedy which the Commissioners took advantage of the surplus excavations from the tunnels of the power works to cover the unsightly exposure. The total length of the crest line of the Falls thus reclaimed is 400 feet, which not only adds considerably to the Park area at a congested point, but also affords views of the Falls hitherto unobtainable. Another statement made by the Association was that the water proposed to be abstracted on the Canadian side alone would make a rapidly flowing river 1,685 feet wide and 18 feet deep, and again, a rapidly running river nearly half a mile wide and 18 feet deep. It is surprising that such incorrect statements should be circulated by a society of intelligent men such as the American Civic Association.

From a perusal of the Act of Congress before recited it will be observed that the Legislation is of a tentative character, and that under its provisions and the decision of the Secretary of War, authority to transmit electrical power to the United States is only granted for a period of three years,



Resting after Lunch



having in view the negotiation of a treaty which would for all time settle the question of the use of Niagara River water for power purposes both by the United States and Canada.

The Secretary of War subsequently determined that the quantities of electrical power which may be imported into the United States by the three companies developing power in the Park should be as follows, viz. :—

The Ontario Power Co	60,000 H. P.
The Canadian Niagara Power Co	52,500 H. P.
The Electrical Development Co	46,000 H. P.

and permits are to be issued for these amounts which will remain in force for three years.

Having thus dealt at length with the constitutional and international questions which have arisen during the past year, a brief review will now be given of the progress made by the several companies that have been engaged for some years in carrying out the important works of development authorized under their agreements with the Commissioners.

THE CANADIAN NIAGARA POWER COMPANY.

As the Canadian Niagara Power Company was the first on the Canadian side of Niagara River to receive a franchise, so has it been the pioneer Company in furnishing electric power for commercial uses. Works of construction were begun by this Company in May, 1901, and have been actively carried on ever since. The first generator having a capacity of 10,000 horsepower was completed and placed in operation on the 1st January, 1905, and at the beginning of 1906, three additional generators of an equal capacity were placed in commission. During that year two more machines were installed, and the Company is now prepared to furnish customers with 50,000 horsepower being the product of five 10,000 electrical horsepower generators. As this Company has completed all its surface and underground hydraulic works for a plant of 100,000 electrical horsepower capacity, the furnishing of additional machinery and extending the Power House (now completed for one-half the ultimate output), to its full length. These works, however, will not interfere with the Park surface beyond the temporary storage of materials and machinery required during the period of construction.

In order to supply customers in the City of Buffalo with electrical power, the company has constructed a transmission line on the Canadian side from the Park to Fort Erie, where it is carried across the Niagara River by overhead cables stretched from lofty steel towers on either bank of the river. These cables are sufficiently high to admit of free navigation underneath. This transmission line has recently been put into service, and power is now being delivered in Buffalo from the Company's works in the Park.

Of the electricity generated by this company, but a small amount has been furnished to home consumers, the great bulk being sold to customers either at Niagara Falls, N.Y., or in the City of Buffalo.

As the output of power generated by the Canadian Niagara Power Company for the half year ended 30th June last, exceeded the ten thousand horsepower which, under the terms of the agreements with the various Power Companies is included in the annual fixed charge of fifteen thousand dollars, it devolved on the Commissioners to examine into and

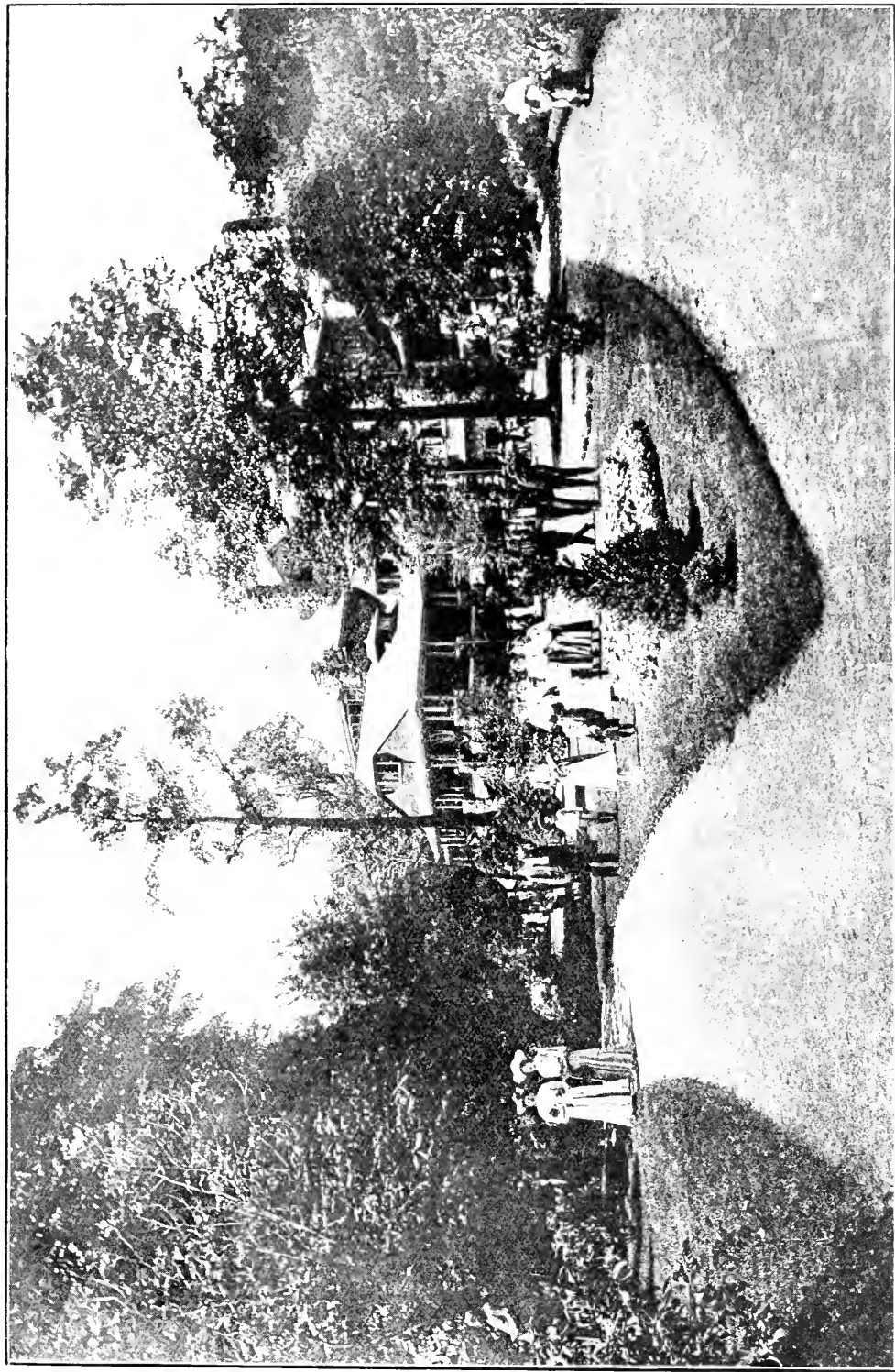
determine the basis on which the rentals for all power in excess of such 10,000 horsepower should be made, and accounts therefor rendered the company. The agreement in this connection provided as follows:

The said agreement of 7th April, 1892, in respect of the amount of rentals and period for which the same is payable is hereby amended by providing that from and after the first day of May, 1899, the rental payable under the said agreement in lieu of that specified in paragraph 4 thereof shall be up to the first day of May, 1949, the sum of fifteen thousand dollars per annum, payable half-yearly on the same days and times as specified in said paragraph 4 of said agreement, and in addition thereto payment at the rate of the sum of one dollar per annum for each electrical horsepower generated, and used and sold or disposed of over ten thousand electrical horsepower up to twenty thousand electrical horsepower, and the further payment of the sum of seventy-five cents for each electrical horsepower generated and used, and sold or disposed of over twenty thousand electrical horsepower up to thirty thousand electrical horsepower, and the further payment of the sum of fifty cents for each electrical horsepower generated and used, and sold or disposed of over thirty thousand electrical horsepower; that is to say, by way of example, that on generation and use, and sale, or disposal of thirty thousand electrical horsepower the gross rental shall be \$32,500 per annum, payable half-yearly, and so on in case of further development as above provided, and that such rates shall apply to power supplied or used either in Canada or the United States. Such additional rentals as shall be payable for and from such generation and sale, or other disposition as aforesaid to the Commissioners shall be payable half-yearly at the rate above specified on the first days of November and May in each year for all power sold in the said several half-yearly periods from the day of sale; and within ten days after said first days of November and May in each year, on which such additional rentals shall be payable respectively, the treasurer or if no treasurer, the head office of the company shall deliver to the Commissioners a verified statement of the electrical horsepower generated and used, and sold or disposed of during the preceding half-year, and the books of the company shall be open to inspection and examination by the Commissioners or their agent for the purpose of verifying or testing the correctness of such statement, and if any question or dispute arises in respect of such return, or if any statement delivered at any time by the company to the Commissioners of the quantity or amount of the electrical horsepower generated and used, and sold, or disposed of or of the amount payable for such additional rentals, the High Court of Justice of Ontario shall have jurisdiction to hear and determine the same, and to enforce the giving of the information required."

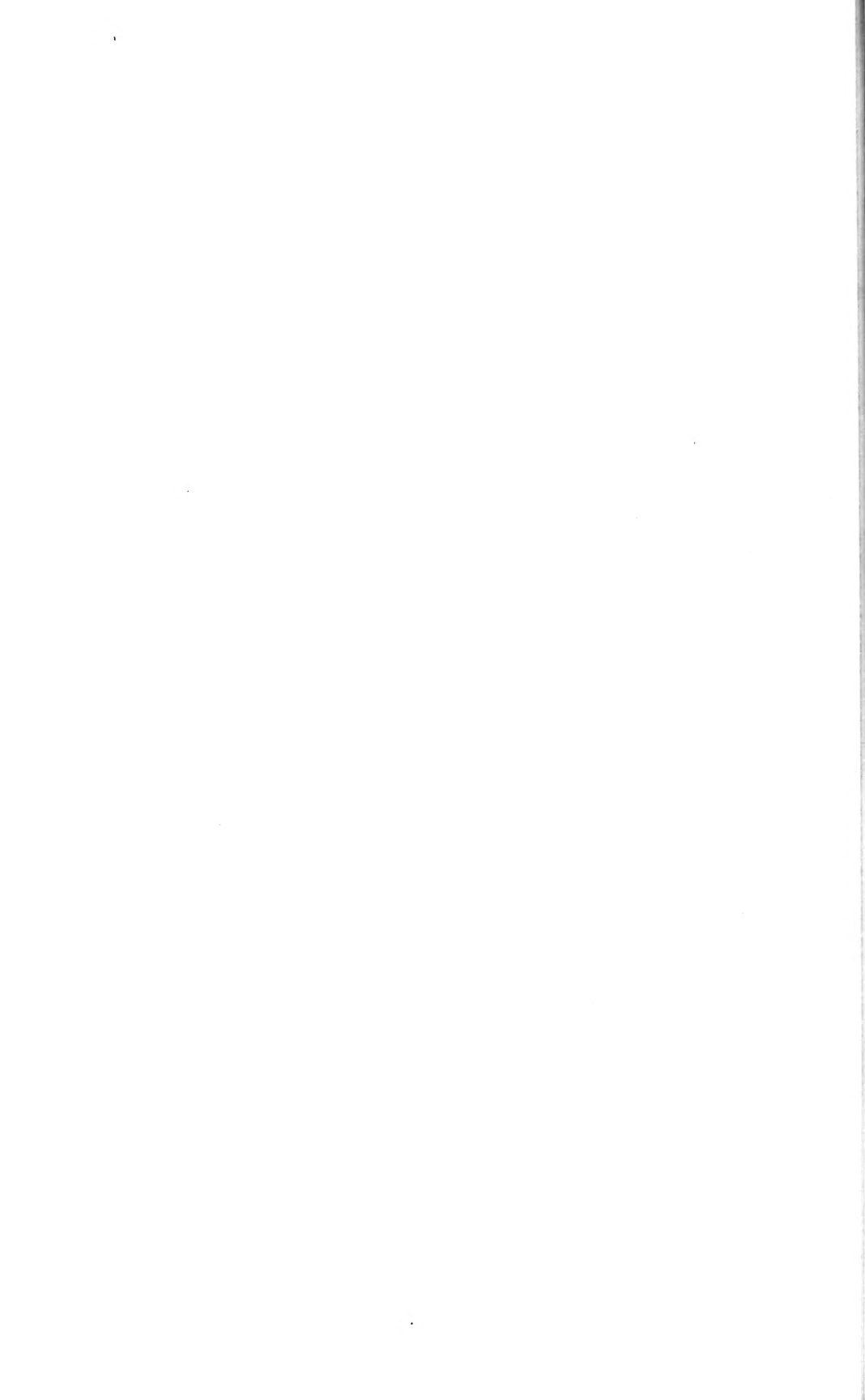
As it was considered possible that some difference of opinion might arise respecting the proper method of computing the rentals for this excess power, the Commissioners decided expert opinion on the subject should be obtained, the question was therefore referred to Dr. Galbraith of Toronto, Principal of the School of Practical Science, for a report.

After a critical examination of all the facts bearing on the question Dr. Galbraith prepared and submitted, a report in which he outlines several methods by which the excess rentals may be determined. These he defined as follows:—

1. "*Increasing rental*" "*Peak power*" system. Or basing the rental upon the maximum peak load developed, and remaining so fixed until a higher peak load is reached.



The Shelter Building, from principal driveway.



2. "*Increasing rental*", "*Average power*" system. Taking the maximum *average daily* load instead of the peak load.
3. "*Fluctuating rental*," "*Peak power*" system. Increasing or decreasing, but based on the daily peak load.
4. "*Fluctuating rental*," "*Average power*" system. Increasing or decreasing based on the *daily average* load.

Dr. Galbraith therefore did not definitely determine the precise method of measurement to be adopted by the Commissioners, but suggested that one of the four systems outlined by him be adopted by the Board. Upon consideration of Dr. Galbraith's report the Commissioners submitted it to Sir Æmilius Irving, the Solicitor for the Park, who advised that the "Increasing rental—peak power" system was the proper system upon which to base the charges under the agreement, and that the accounts for the excess rentals be rendered accordingly.

As the agreements which have been entered into with the Ontario Power Company, the Electrical Development Company, and the Canadian Niagara Power Company are all identical in respect to the principle of charging for power generated and sold above a certain clearly defined amount, and as the works of each of these Companies are being carried out upon a gigantic scale, which in the future will yield a very large revenue, the finite settlement of the proper method of accounting became of the utmost importance, the Commissioners therefore decided that before rendering a bill to the first company, which has come under the provisions of the excess rental clauses of the agreements, that the whole question should be submitted to the Lieutenant-Governor-in-Council in order that the Government should direct the course to be pursued by the Board, and this has accordingly been done.

In the meantime, and until a decision has been given by the Government upon the question, the Company has not been called upon for payment of the additional rentals due.

THE ONTARIO POWER COMPANY.

In their report for the year 1905, the Commissioners referred to the difficulty which had been met with in the proper architectural treatment of the Spillway building for the Ontario Power Company, and also the portal building, by which access is had to the elevators to the Power House of the Company on the lower bank of the river, and to the Transformer House and offices situated on the high bank immediately overlooking the Park.

Early in the year, however, after a great deal of consideration, the company presented plans, prepared by Messrs Greene and Wicks of Buffalo, which upon examination were found to be satisfactory to the Commissioners, and were therefore approved of, and the buildings are now nearly finished. When quite completed the structure will be most artistic in design and finish. It is provided with a broad promenade around the exterior at a high level which will afford the public new and very comprehensive views of the Falls, the river and the Park. Apart from these very important works, the Company have not carried on any new construction works affecting the surface of the Park, and all the cleaning up work to be done by this company, and which remained unfinished at the close of 1905 has with the exception of the Spillway been brought to a satisfactory completion.

A fourth generator has been recently completed in the Power House of this company of larger capacity than the three machines previously installed, viz., 12,000 electrical horsepower unit, instead of 10,000. The larger machine has proved so successful that it has been decided to install the next two generators of the same capacity.

Notwithstanding the plant of the company was capable of producing 30,000 electrical horsepower at the beginning of 1906, the Commissioners have not yet received any payments on account of rentals for power generated in excess of the 20,000 H.P., for which a fixed rental is payable.

In order to transmit power to customers in the United States, the company have constructed transmission lines extending from their Transformer House, overlooking the Park to a crossing of the Niagara River, one mile south of Queenston Heights. These Transmission lines are composed of heavy aluminum cables strung upon steel towers, and are carried over a private right of way.

It is interesting to note that part of the electrical output of this company is being transmitted as far as Rochester and Syracuse, the latter point being about one hundred and sixty miles from the generating station. This it is claimed is the longest transmission line in successful operation east of the Rocky Mountains.

ELECTRICAL DEVELOPMENT COMPANY.

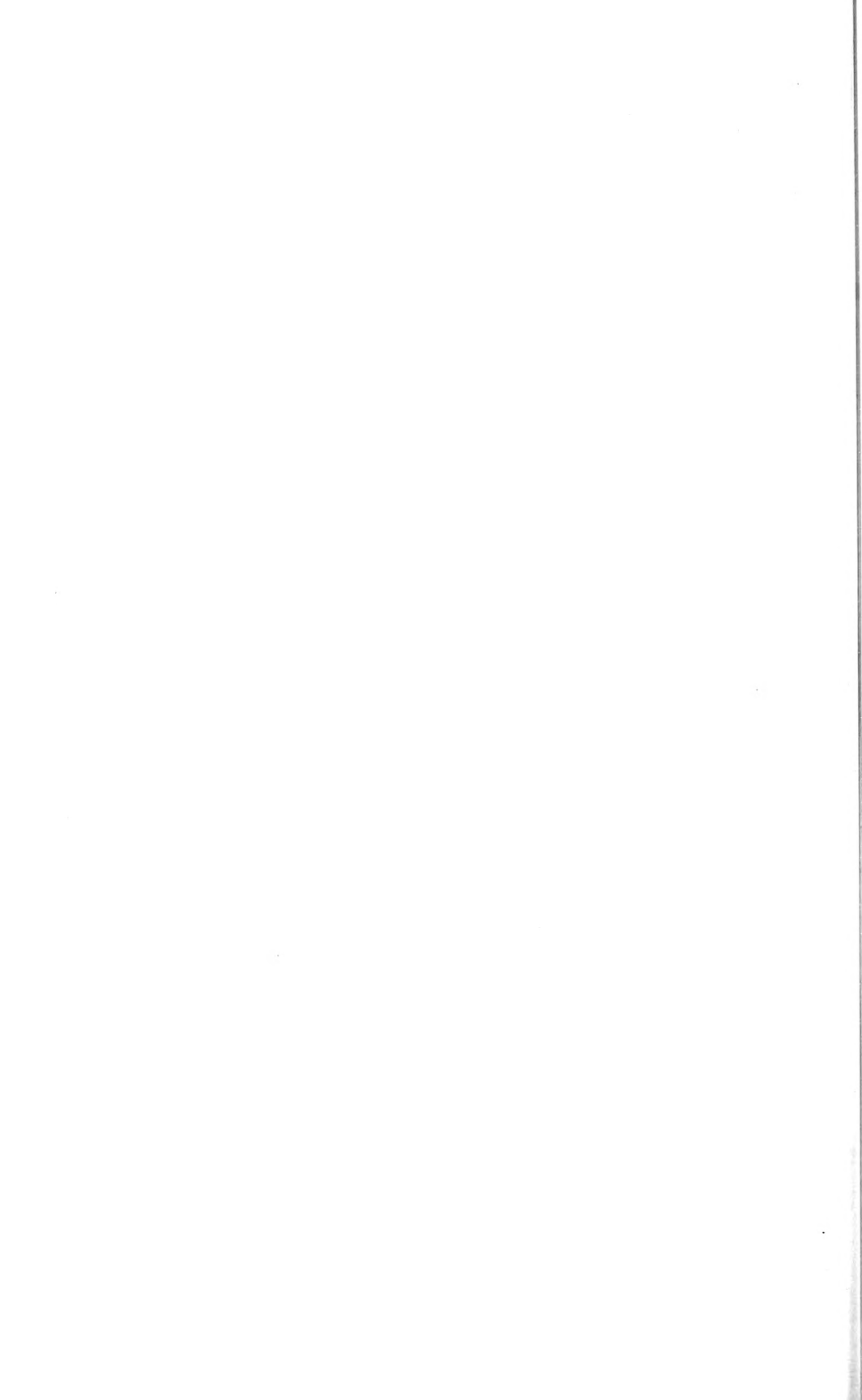
Excellent progress has been made by this company in the preparation of its extensive works for the delivery of electric power. The walls of the Power House, extending to about two-thirds of the final length of the building, have been built up and the structures roofed in. This building is of classic design, constructed of Indiana limestone, and specially designed for the position it occupies in the Queen Victoria Park. Two electric generators each of 12,500 horsepower are ready for work, and the City of Toronto has been receiving electric current from the Power House of the Company in the Park since the third week in November.

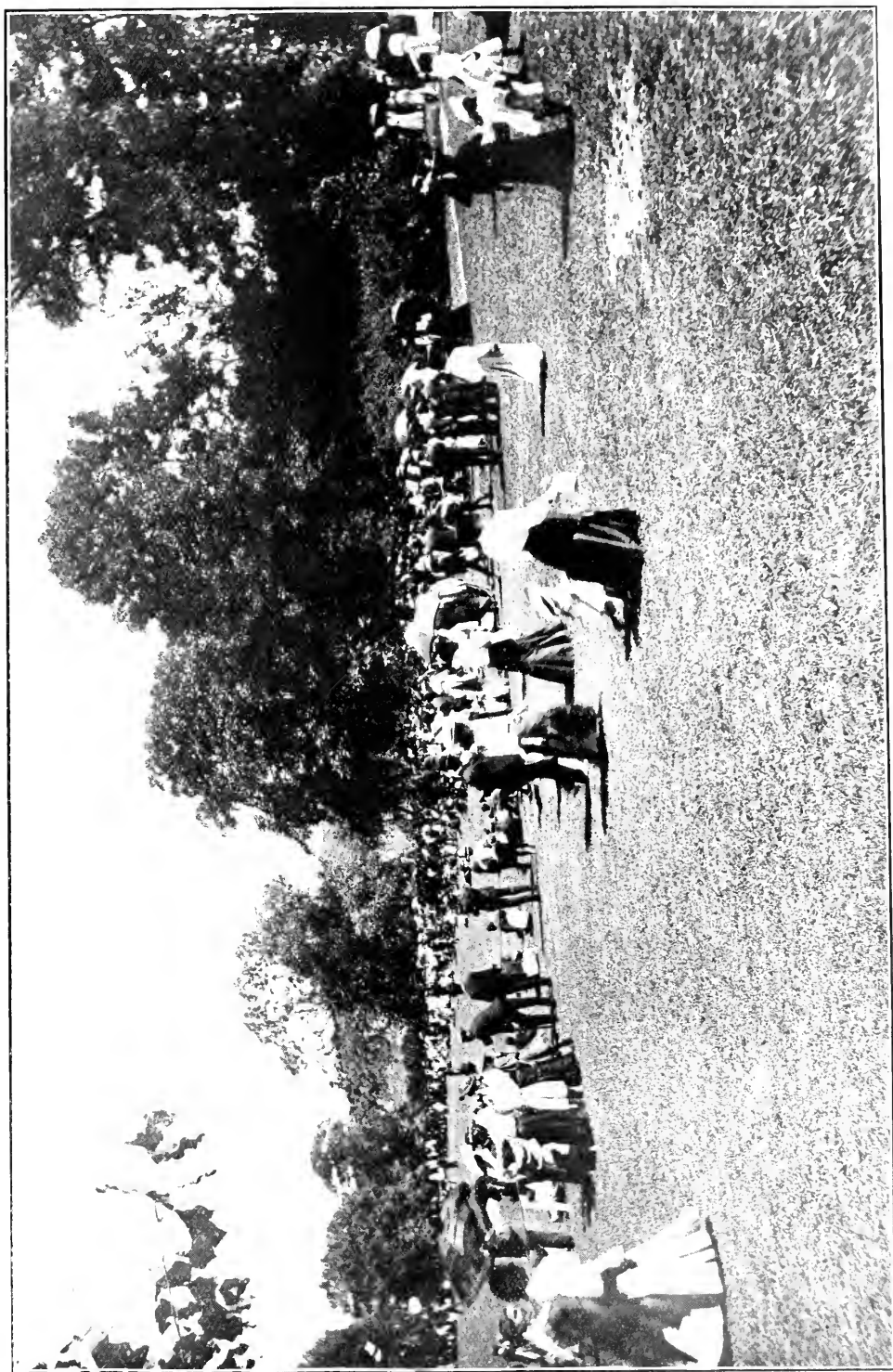
The completion of the Forebay, and the removal of the greater part of the enclosing Coffor Dam from the river bed has done away with the last great obstruction to the free flow of the river within the Park, and the Forebay has now practically assumed the normal appearance, it will present for all time to come. Notwithstanding the great energy with which all the works of this company have been prosecuted during the year, the magnitude of the undertaking has prevented any attempt being made to clean up or restore the grounds about the Power House. By the end of next season, however, the Commissioners expect that this greatly desired work will be accomplished, and the full effect of the changes which have been made in the Park by the works for the development of the water power for commercial purposes will be clearly seen.

The three corporations which have obtained franchises to develop the water power of the Niagara River within the limits of the Park have in the aggregate already expended nearly seventeen millions of dollars in carrying out their plants for the generation of electric power, and it is estimated that a further sum of ten millions will be required in order to complete the works to the full capacity authorized by the agreements entered into with the Commissioners, and confirmed by the Legislature. These important works have all been undertaken in reliance upon the natural free and unobstructed flow of the waters of the river to the works.



At Spring Water Fountain, from Shelter Building.





Watching the Sports

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and it is clearly of the utmost importance that no act which would in any manner jeopardize or affect the flow of the waters should be committed. The Commissioners therefore are of the opinion, and strongly recommend that the bed and foreshores of the Niagara River lying above the present park limits, and extending as far as the mouth of the Welland river should be set apart and appropriated to preserve for all time the natural and unobstructed flow of the waters of the Niagara River.

GENERAL WORKS OF IMPROVEMENT.

The Commissioners have effected several marked improvements in the Park in the course of the year. The iron pipe railing which protected the edge of the cliff opposite Table Rock has been removed and a substantial permanent revetment wall with ornamental panelled railing, and curved recesses at points of great interest where the visitor may rest and enjoy the unexcelled views of the Horseshoe Fall at his leisure, has been constructed along the whole extent of the cliff to the edge of Fall. It is proposed to construct a concrete walk along this revetment in the spring.

As the wire and post fence along the Ferry Street boundary was out of harmony with the surroundings, the construction of the new Clifton House near the north end of the Park proper made it desirable to have a suitable fence at this important point; it was also considered advisable to change the location of the Mowat Gate, the principal entrance to the Park, to a point nearer the river bank, and more in line with the driveway along the front of the new hotel from the Upper Steel Arch Bridge.

A new entrance was therefore laid out with a driveway connecting with the main Park drive at the Superintendent's Office, and a handsome granite gateway is now in course of construction at the entrance, with a granite and ornamental iron panelled fence extending along the whole of the north boundary of the Park and Ferry Street. This important work will be completed before the spring.

Owing to the great increase in the number of picnic parties and visitors frequenting the Park, it was found necessary to add a new shelter and conveniences which have been very greatly appreciated during the summer.

Notwithstanding the fears of some that the foliage which has formed such an attractive feature of the Dufferin Islands would be destroyed by temporary diversion of the water from the channels in the Islands, in order to permit of the construction of the Ontario Company's head works, it is satisfactory to know that very little damage has been done to either trees or shrubs. The new driveway around the main shore, which was completed this season, has added greatly to the convenience of the public for viewing and enjoying the varying scenery of the Islands. The numerous artificial cascades which have been formed, the greatly increased number, and enlarged area of the group of Islands, and the comprehensive outlook from the elevated promenade over the Screen house, over the whole course of the upper rapids from the brink of the Falls to smooth water above Chippawa, all combine to make this one of the most charming and interesting corners of the Park.

Some small roadway and footway bridges over the streams dividing the Islands are still required, and will be constructed in the spring.

NIAGARA BOULEVARD.

Some progress has been made in the important work of providing a broad and well graded Boulevard along the bank of the Niagara River, between the Park and Fort Erie, to which reference has been made in previous reports. When the Government granted to the Commissioners, the reserve of one chain in width along the water's edge, it was found that in many places this had been so narrowed in by the erosive action of the river on the clay banks that very little of the original sixty-six feet remained, and the driveway was in consequence much too narrow for safety. As every period of high water did further damage the Commissioners, with the approval of the Government, began works of protection which they have carried on from year to year until at the present time five miles of the shore line have been made secure, and only about two miles remain where danger from erosion is apprehended.

In addition to protecting the shore, the Commissioners have, in order to widen out the highway to a suitable width for a Boulevard, acquired additional land from the adjoining properties at many of the narrowest places. Unfortunately however, the funds at the disposal of the Board have always been very limited, and the Park at Niagara Falls has very naturally demanded the first consideration so that but a small sum annually could be expended upon the development of the numerous properties which have from time to time been placed under the jurisdiction of the Commissioners. During the past year, therefore, no additional purchases of property have been made, but about three-fourths of a mile of new roadway has been formed upon lands previously acquired, and the travelled highway diverted for this distance from dangerous proximity to the steep bank of the river.

In order to make a continuous boulevard from Fort Erie to the Park, it will be necessary to bridge the mouth of the Welland River at Chippawa, and construct a new connecting link along the margin of the Niagara River to the southerly Park limit, a distance of a little over a mile.

Originally there was a reserve at this point, but it was disposed of by the Crown many years ago, and therefore was not included in the patent granting the Chain Reserve to the Park Commissioners.

As there will probably be a large surplus of materials suitable for filling available when the power development works are fully completed, the Commissioners desire to take advantage of these excavations to construct an esplanade along this reach of the river front which will form a charming driveway and entrance to the Park from Chippawa and the south.

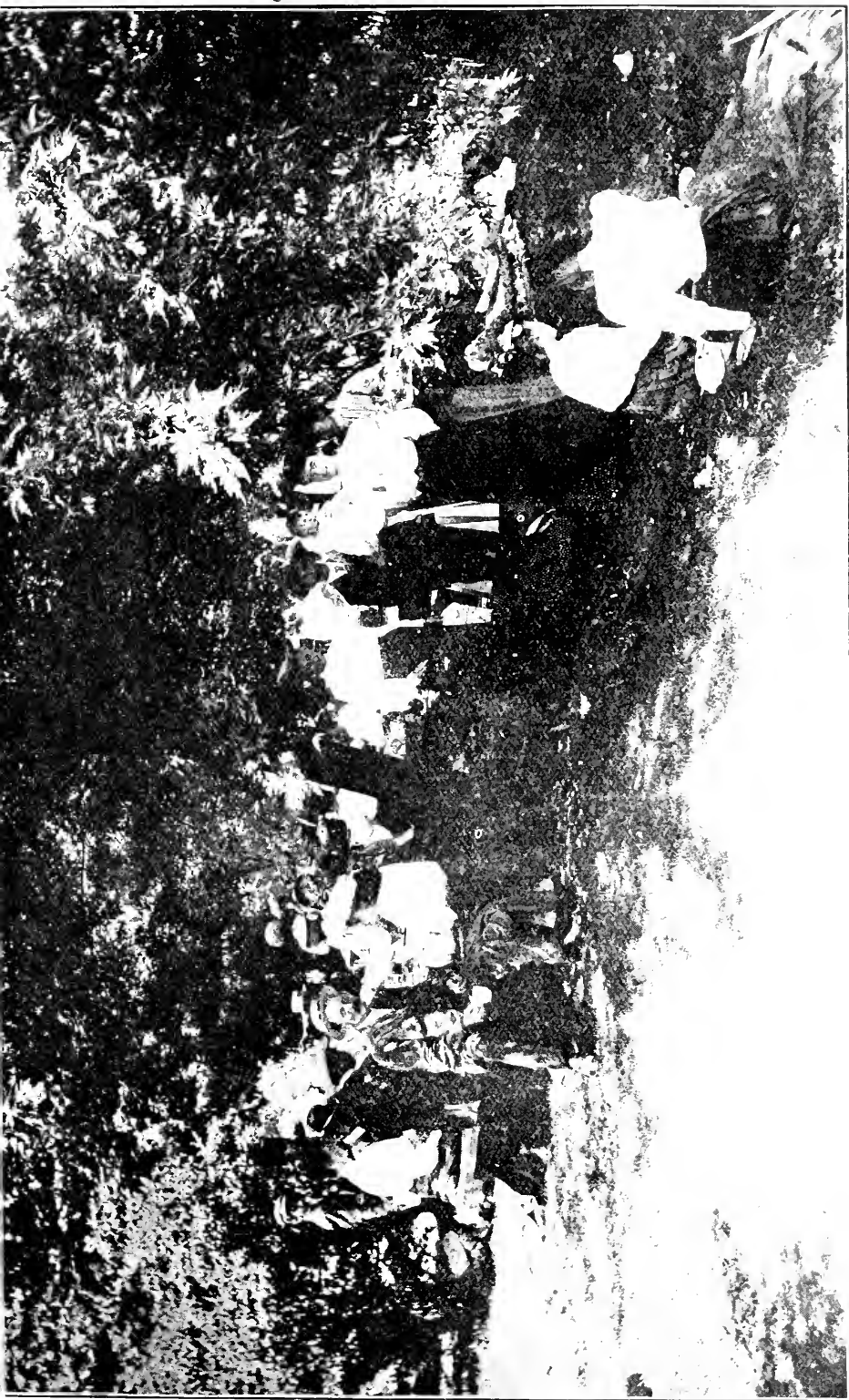
OUTLYING PARKS.

The usual works of maintenance and improvement have been carried on at Fort Erie, Niagara Glen and Queenston Heights. At the latter point a new rustic arbor has been built at a sheltered spot on the crest of the heights near Brock's Monument, from which a comprehensive outlook over the Niagara River and valley may be quietly enjoyed.

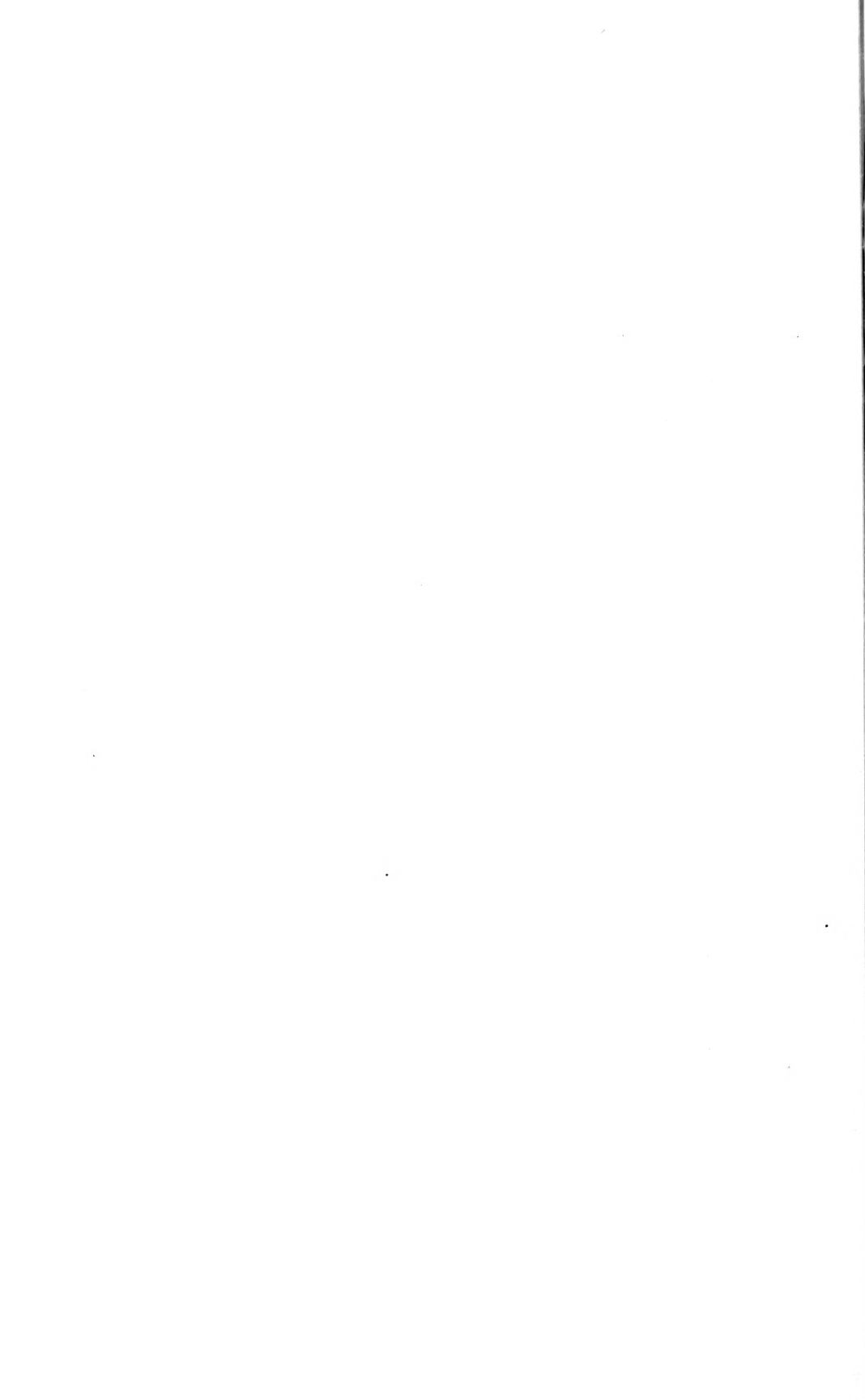
As there has been a very marked increase in the number of visitors to Queenston Heights in recent years, attracted doubtless by the magnificent views which have been provided for the comfort and recreation of picnic parties; the Commissioners decided to reduce the toll charged for ascending to the top of the Monument from twenty-five cents to fifteen cents, and



Watching the Ball Game.



A Corner of the Picnic Grounds.



this was accordingly done at the commencement of the season. That the reduction was justified has been abundantly proved by the fact that the revenue has not only been maintained, but actually shows an increase over the year 1905.

Were it not for the narrowness of the interior of the shaft, and the very limited space at the top available as a view point, the Commissioners would be disposed to construct a lift in order that the magnificent views from the high altitude might be availed of by larger numbers.

In order to provide for the increased number of picnic parties frequenting these grounds, the Commissioners have in view the construction of an additional shelter, a little to the west of Brock's Monument.

Notwithstanding the physical effort required to reach it Niagara Glen continues to attract visitors in increasing numbers; its wonderful and rare geological and botanical treasures proving a never failing source of interest to citizen and stranger alike. Some additional paths have been constructed and resting places provided to facilitate the comfort and convenience of visitors.

At Fort Erie Park some planting was done in the spring, and a large part of the ground at the rear of the old fortifications which was very uneven was plowed and harrowed into shape, and will be sown with good lawn grass in the spring.

A shelter for visitors in time of storm is urgently required at this point, which is also becoming more attractive year by year.

A full reference to the various works of maintenance and improvement which have been carried on during the year will be found in the report of Park Superintendent, appended hereto.

The statement of receipts and expenditures for the year will also be found herewith.

All which is respectfully submitted,

J. W. LANGMUIR,

Chairman.

GEORGE W. WILKES.

ROBERT JAFFRAY.

P. W. ELLIS.

L. CLARKE RAYMOND.

QUEEN VICTORIA NIAGARA FALLS PARK.

FINANCIAL REPORT.

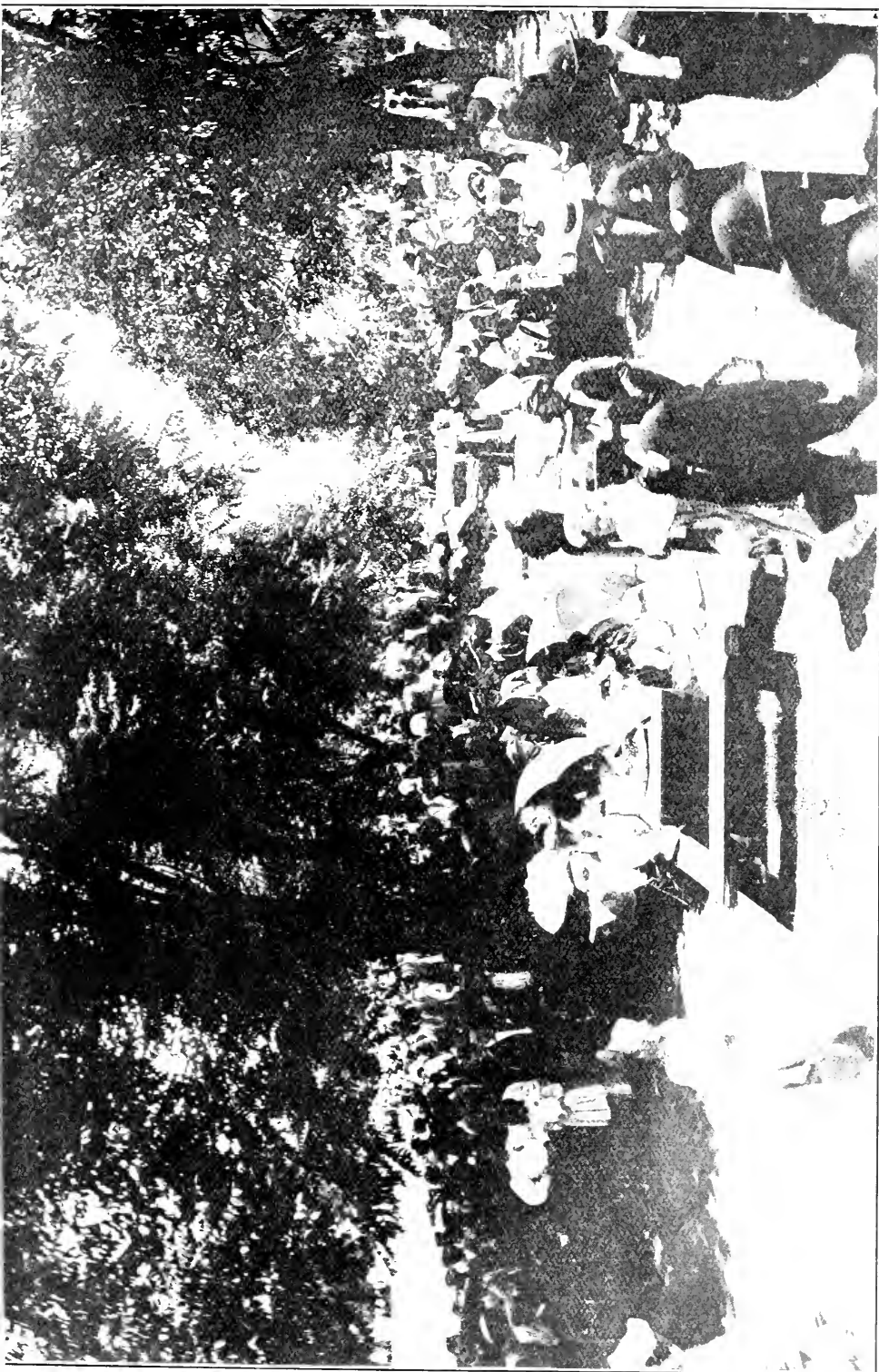
Receipts, 1906.

Ontario Power Company, rental	\$30,000 00	
Canadian Niagara Power Company, rental	15,000 00	
Electrical Development Company, rental	15,000 00	
International Railway Company, rental	10,000 00	
Zybach & Company, rental	9,000 00	
“ “ balance from 1904 rental	850 00	
Brock's Monument tolls	936 15	
Wharf privileges	463 00	
Sundries	426 45	
		\$81,675 60
Overdraft in Imperial Bank, December 31, 1906		26,883 23
		<u>\$108,558 83</u>

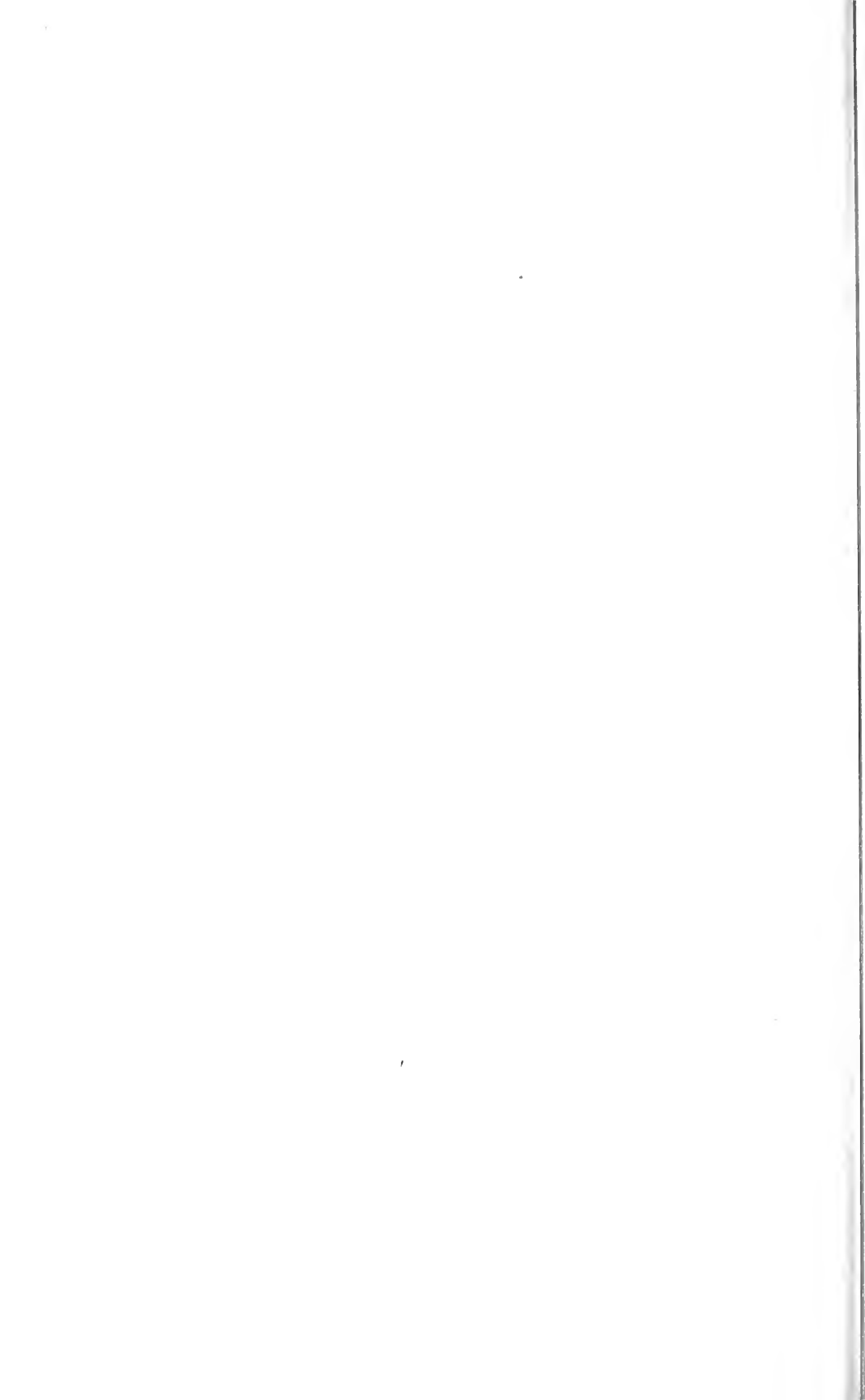
NOTE.—The special deposit to credit of Commissioners made in 1903, for maintaining water levels at intakes of Canadian Niagara Power Company and International Railway Company now amounts to \$25,862.46.

Expenditure.

Paid Imperial Bank overdraft, January 1st, 1906		\$26,734 21
Capital Account:		
Paid wages, permanent works	\$5,183 42	
“ materials, permanent works	4,218 51	
“ contracts	11,003 00	
“ land purchases	48 07	
“ legal expenses	1,235 00	
“ miscellaneous	5,308 47	
		\$26,996 47
Maintenance Account:		
Paid salaries, office and clerical staff	\$4,875 00	
“ salaries, constable and gardener	8,075 52	
“ wages, laborers and teamsters	9,390 82	
“ for materials	5,539 06	
“ office expenses	358 81	
Commissioners' expenses	580 73	
“ miscellaneous	893 74	
		29,713 68
Paid interest on bonds, including bank charges		25,114 47
		<u>\$108,558 83</u>



The Picnic Grounds - A Busy Day.



APPENDIX A.

REPORT OF THE PARK SUPERINTENDENT.

To the Commissioners of the Queen Victoria Niagara Falls Park:

GENTLEMEN,—I beg to make the following report upon the works which have been carried on during the year 1906 in the original Park reservation at Niagara Falls, and also in the extensive outlying territory which is now included in the Queen Victoria Niagara Falls Park system.

Owing to the continually increasing works of restoration and improvement being carried on in the extensive system of Park areas now under the control of the Queen Victoria Niagara Falls Park, and to the consequent necessity for increased supervision of these works, and more frequent inspection of the outlying territory than could be given by the Superintendent, the Commissioners appointed Mr. J. Harrison Pew, as Assistant Superintendent on 1st May, 1906, with special jurisdiction over all works of improvement and maintenance of the grounds, at Queenston Heights, Niagara Glen and Fort Erie and the protection and widening of the Boulevard along the Niagara River between Chippawa and Bridgeburg.

Last year's report contained a full reference to the surfacing and planting of the new and extensive additions which had been made to the Dufferin Islands and to the restoration of the long reach of park surface which had been so greatly disturbed by the construction of the Ontario Power Company's pipe line works. The grounds so restored and resurfaced have largely assumed a normal appearance and another season will suffice to complete the protection of the new surface soil by a heavy growth of sod, and allow the extensive plantation of nursery stock to become thoroughly established.

Unfortunately the season of 1906 was a particularly hard one on newly transplanted stock, several periods of severe drouth occurring in the hot months before the roots had taken firm hold of the ground and hand watering was required, which taxed the energies of the staff to the utmost; notwithstanding the expenditure of a great deal of labor upon this work some of the best and most matured specimen deciduous shade trees in the transplanting of which great care and skill had been exercised, and which were depended on to give immediate sylvan effects at critical points, were lost. Fortunately the newly planted shrubs and vines, whose roots do not require such deep soil, did not suffer so much from the severe climatic conditions and were nearly all pulled through.

The thickly wooded portions of the original group forming the Dufferin Islands stood the test of having the water entirely shut off for a third season remarkably well, only a few of the evergreens along the margin of the main stream having perished. It was hoped at the beginning of the year that the works of the Electrical Development Company's forebay would be sufficiently advanced by spring to permit of the flooding of the island channels before the dry season commenced. This, however, was not accomplished, and the season of growth was over before the water was permanently admitted.

During the past year the important works at the Spillway building, the terminal safety valve of the Ontario Company's 18-foot hydraulic supply pipe, near the Refectory, were taken in hand, and the heavy construction operations required in adapting this lofty and massive concrete structure to the aesthetic conditions demanded by its location have now been practically completed.

In accordance with the design approved by the Board, there will be two promenades constructed around the Spillway, the lower one being on a terrace ten or twelve feet above the general park surface in front and merging into the bank at the rear.

It is proposed to screen the face of the terrace with perennials and dwarf flowering shrubbery planted in masses and interspersed with large boulders and rockeries of creepers. The shrubbery gradually becoming more robust towards the rear so as to blend in with the foliage along the base of the side hill. Behind the terraced walk referred to a random jointed stone retaining wall capped with a substantial dressed lime stone parapet provides a second promenade on a much higher level. This broad and elevated promenade encircles the Spillway building proper, the principal access to it being by a broad flight of steps in front leading to a landing thence by steps on either hand to the proper level; while at the rear the promenade will form a junction with the existing walk along the foot of the slope from the rear of the refectory building on the north, and with a new walk proposed to be terraced along the side hill from the Spillway southwards as far as Table Rock House, from which ever changing panoramic views of the Horse-shoe Fall may be had.

Sufficient soil will be placed at the base of the retaining wall for the upper promenade to sustain a vigorous growth of vines and creepers, whose drapery will in a year or two effectually screen off the stonework from view. The copper roof and cornice of the main building will project several feet over the main promenade, supported on massive ornamental iron brackets.

Without question this roomy and commanding outlook will be very much appreciated by visitors to the Park as owing to its location it will be comparatively free from spray, while its elevation and proximity to the river will afford most charming prospects in every direction.

Immediately to the south of the Spillway Terrace is the small portal building, which has been designed to harmonize with, and form part of the picturesque development of the Spillway. The structure is ornate and well proportioned, constructed of Indiana limestone, and roofed with copper.

The doorway is protected by a deep canopy of glass and ornamental iron work, and the interior will be handsomely fitted up and furnished. A semi-circular carriage way connects the front entrance with the main park driveway.

From the portal building a short brick lined tunnel into the side hill leads to an electric elevator descending in a shaft to the power house level, where a second brick lined and well lighted tunnel has been cut through the rock to connect with the gallery floor of the power house on the lower river bank.

The tunnel from the portal building to the lower elevator is continued on into the side hill several hundred feet to a point immediately underneath the centre of the general offices of the Ontario Power Company and from this point a vertical elevator ascends directly up to the several office floors above.

The construction of this upper tunnel and shaft proved to be an exceedingly difficult and costly undertaking, the unsuspected presence of a large body of water and quicksand near the junction of the two necessitating a resort to the use of compressed air, with its accompanying air locks and other devices for working under pressure, and much time was spent in overcoming the difficulty. The outer casing of the tunnel is of the usual cast iron ring type, made in segments bolted together—the interior lining is concrete; finished to a uniform color. The casing of the shaft is similarly of circular

cast iron section but is not lined with concrete save near its junction with the tunnel.

Much levelling and cleaning up has been done about the power house of the Canadian Niagara Company during the year, and, with the exception of the top dressing of good soil over the disturbed areas, practically the whole of the works of this Company have been completed. A few of the temporary wooden buildings used by the contractors during the construction of the plant have yet to be taken away but these will all be removed before the opening of spring.

Notwithstanding the comparative mildness of the winter of 1905-6 and the protection works devised by this company to keep floating ice out of the forebay, it was with great difficulty that the ice and frazil could be prevented from interfering with the operation of the works; additional protection has therefore been made by sheeting the face of the outer rack with heavy iron plates which will act as a solid barrier to the surface floating ice passing down the stream at the intake. In addition to this precaution the company have adopted a very ingenious method for preventing ice which may pass through the rack below the barrier from forming into a solid mass. A very substantial screw-driven ice boat has been constructed to ply about the forebay between the bridge and the power house, the motive power being electricity supplied through a trolley carried on feed wires suspended high above the surface of the water. This trolley boat can traverse the whole area of the forebay without difficulty, and is expected to keep the ice broken up and force it into the ice weir to be carried hence back into the river well below the intake. So far the weather has been too mild to permit of a proper test of its efficiency being made.

The Electrical Development Company's surface works have made good progress during the year; the heavy excavations of the forebay and the construction of the southern extremity of the forebay wall were brought to a conclusion by mid-summer, and active work upon the removal of the massive cofferdam was begun shortly after. The underground conduits through which the cables to convey the electricity generated in the power house are carried, have been completed.

On account of having to cross over the present and prospective pipe lines of the Ontario Power Company, it was necessary to build part of the conduit a little above the ordinary park level, but as the Company had a large quantity of stone and clay in the coffer dam which had to be disposed of, this material was utilized to form a mound over the raised part of the conduit. This work is very well advanced, and when finished will be made to form an attractive feature in the layout of this portion of the Park.

All the grounds about the power house have been roughly graded to the approved contours, but owing to the very extended space required for storing the materials needed in the work it has been found impossible to complete the levelling or surfacing of any of this area. All the temporary structures put up by the Company's contractors in connection with the tunnel work, and which occupied a great deal of space near the International Railway intake have been removed, and the mouth of the shaft has been substantially floored over at the ground level with only a manhole left for future access should that be required. The manhole will have an iron cover plate similar to those in use on the conduit lines in the park.

The building of the walls of the power house were begun in the spring, and sufficiently completed to permit of the permanent roof being put on the greater part of the building before winter set in. Should mild weather continue, the whole of this imposing structure will be finished by the be-

lining of February, with the exception of the interior finishing and the placing of the windows and doors.

The removal of the cofferdam and the consequent restoration of the waters of the river to the portion of the original river bed taken for the forebay has made a very marked improvement in the appearance of the shore line from every point of view, and already the wild rush of waters which caused this portion of the rapids to be known as Tempest Point prior to the works being undertaken, have reasserted their power with only a slight change in the direction but none in the volume of the cascade which was the chief charm of this portion of the Park.

The wings of the cofferdam which connected with the works of the Ontario Power Company have yet to be taken away, when the permanent effect of all the power works upon the water views of the park from every vantage point will be made clear.

Many permanent improvements have been made in the park at Niagara Falls the past season.

The Mowat Gate, the principal entrance to the park, and which was constructed of cedar work when the park was established in 1887, was greatly in need of renewal.

It was also found desirable to change the location to a point much nearer to the water front, and to make the driveway considerably wider than before, owing to the increased number of vehicles entering the park. The change in the location involved constructing a new driveway connecting the new entrance with the original roadway near the superintendent's office by an easy alignment and with very light grades.

The new gateway consists of two main pillars of Stanstead granite, four feet square and fourteen feet in height, surmounted with the park arms cut in granite in full relief. On either side, and leaving a clear space of nine feet for a walk in each case there is a smaller pillar of similar design but without the arms on top. These side posts are three and a half feet square and eleven feet in height,

The four gate pillars are set back seventeen feet from the line of Ferry Street, and the roadway curbstone as well as the new ornamental fence sweeps in to the gateway with a suitable curve.

The former iron post and stranded wire fence which extended along Ferry Street has been removed, and a new and handsome rock faced granite and ornamental iron panelled fence has been constructed. Owing to the steep grade on Ferry Street this fence has been built in steps, each panel above the gateway having an elevation of from three to eighteen inches above the one immediately next to it on the east. Opposite to the Ferry Street entrance to the Clifton House a pathway entrance has been made, and another near the western limit of the park for the convenience of visitors. When this work is fully completed it will add materially to the dignity and character of the northern or principal entrance to the park. The old driveway, where abandoned, has been made into a walk for the convenience of Clifton House visitors, and the spring water fountain which stands a short distance from the former entrance will be changed to conform to the new conditions.

At the picnic grounds, it was found necessary to provide much greater accommodation for picnic parties, and shelter in case of rain or heavy spray. This was accomplished by constructing an additional shelter building of permanent materials similar in its general characteristics to the one described in the last annual report excepting that the hot water apparatus has been installed on the floor level instead of underneath, and the length is about

sixty feet instead of one hundred and twenty. In connection with this shelter suitable lavatory conveniences for men and women have been provided. Reference has been made in former reports to the recession of the waters of the river from the vicinity of Table Rock owing to the cutting away of the apex of the Horseshoe Falls, and to the filling up of the river bed to the general park level, which was done from the surplus materials excavated from the works of one of the power companies. Who were also obliged to build a heavy revetment wall along near the edge of the cliff in order to protect the filling and form a foundation for a suitable parapet wall. This parapet has been constructed after the same general design as the one built by the Ontario Power Company overlooking the power house. The copings and piers are of rock-faced Queenston limestone, with ornamental panels of iron work. The alignment follows the general direction of the cliff and as close to it as was considered prudent, and curved recesses have been made at either end where seats will be placed for the convenience of visitors desiring to rest while enjoying the unrivalled views of the river and surroundings here afforded.

Ultimately, when the filled in portion has been properly protected by riprap, it may be found desirable to extend this parapet as far south as the intake of the International Railway Company as the character of the work is entirely suitable, and the protection which it would afford to visitors at this much crowded point would be very great.

Addition was taken of the grounds which the Power Companies had levelled off and surfaced by early spring, to plant out a large consignment of imported stock, much of it of a half hardy nature, which added materially to the aesthetic restoration of these portions of the park. Some very choice specimen bay trees and evergreens of various kinds were also planted out for the summer in the grounds about the refectory building, making a very fine display at this central point from early summer to the close of autumn.

As all the half hardy stock requires to be put into shelter for the winter, an addition was made to the storage capacity of the building specially designed three years ago by the chief gardener for this particular purpose. This most useful adjunct of the greenhouse is a simple underground construction with concrete walls and steep roof of double glass, the roof only showing above the surface. A space below the roof is left for packing in straw protection against cold, and provision is made for regulating the admission of sunlight. By the adoption of these measures the gardener has wintered safely, and had in perfect order in the spring, all the semitropical plants which have been so far procured for the park.

As has been noted on several previous occasions, the greenhouse accommodation in the park is altogether too small for the valuable stock of plants now on hand, the consequence being that not only have the plants insufficient room for normal development but additional stock cannot be housed. An entirely new conservatory of generous proportions is most urgently needed.

As an indication of the very favourable conditions for the growth of plants which obtains at the Queen Victoria Niagara Falls Park, it may be instanced that on the 21st of January, 1906, the gardener picked from the perennial bed near the Jolly Cut entrance to the park, a bouquet of flowers growing freely in the open, and on the 10th of January, 1907, about a dozen full blown specimens of the *Heleborus niger* or Christmas Rose were gathered to make into a funeral wreath.

As the Mowat Gate, to which reference has already been made, was not required in connection with the handsome new stone entrance to the park,

it was removed from the front on Ferry Street and set up at the base of the hill near the cricket grounds, the sections being re-arranged so as to make a convenient shelter and dressing rooms for the citizens frequenting the cricket and lawn tennis grounds. Although constructed of wood, the enclosed parts of the gateway building had stood the test of the years remarkably well and but little outlay was required to adapt it to its new purpose; the numbers who took advantage of the provisions which have been made for outdoor recreation in the park are increasing from year to year and the addition of two more lawn tennis courts and a bowling green would be greatly appreciated.

The rustic shelters built at Inspiration Point and "Rambler's Rest" are greatly in need of renewal, these light structures of open cedar work roofed with elm bark have served a good purpose for eighteen years, and as they are located at two of the most desirable view points on the margin of the cliff, the present structures, which will in any case have to be removed in the spring, should be replaced by suitable erections of a permanent character and of ornate design and construction.

The two small wooden buildings now used as shelters for the park constables, one located at the Dufferin Gate entrance and the other near the International Railway power house, are unsuited for the purpose and should be replaced by neat little structures of stone or brick to harmonize with the permanent character of all the new erections in the park. The cost of these shelters would be great, while the annual outlay for repairs would be much less than at present.

Notwithstanding the very large number of excursionists and picnic parties who visited the park in the summer months, good order has been maintained throughout. The decrease in the number of workmen employed in the power development works, who were largely foreigners, has made the task of preserving the peace less onerous than for the past four years.

The very important work of protecting the shore line of the river between Chippawa and Fort Erie from erosion has been carried on during the past season, and a further reach of one and four-tenths miles has been rip-rapped and made secure against the cutting action of the water. Up to the present time fully three and two-thirds miles of the worse points on the river have been attended to, and as the erosion is actively going on at various points, aggregating a total of about two miles more, the protection work already put in has on several recent occasions been subject to very severe tests by reason of extremely high water accompanied by a strong wave action; at many points the water rose above the level of the rip-rap and threatened the clay banks above, but only at two or three places where the protection had not been carried to its full height was any damage occasioned, and even there it was but slight, and will be easily repaired. On the whole, the method adopted has accomplished the purpose for which it was designed, and will prove a permanent barrier against further erosion. The work should be continued in 1907, until the remaining two miles are likewise protected.

No additional lands to widen the highway were purchased during the past year. At several points, however, where land had been acquired previous to 1906, a new roadway was constructed and the travelled way removed from too close proximity to the steep bank of the river. Up to the present time the reserve has been widened for an aggregate distance of three miles only, and as many points remain where the road is too narrow to permit of carriages passing each other, the necessity for continuing the widening will be apparent.

The establishment of the shipbuilding works on the river three miles below the Village of Bridgeburg, and the prospect of a blast furnace and iron works in connection therewith at an early date will doubtless increase the travel between these two points.

At Fort Erie Park a large stock of hardy deciduous trees and flowering shrubs were planted out in the spring, but owing to the very severe droughts already referred to, the trees did not have a favourable opportunity to secure a proper root growth before the hot season and a great many perished. The shrubs, however, took much better hold and nearly all of them survived. They will add very greatly to the appearance of the park when they attain a year or two of growth.

The broken and uneven ground in rear of the earthworks was ploughed and harrowed in order to secure a better and more even sod. The drainage of some low ground was also attended to, the front fence newly painted, and all the grounds kept in good order throughout the year. A shelter for the public is badly wanted at this park as there is now no place where visitors can get under cover in case of storms, the place is very much exposed and the facilities for reaching shelter are at present inadequate.

Queenston Heights Park has been kept in good condition throughout and many improvements have been made during the year. New paths have been constructed to the site of the Redan battery which was visited by Major-General Brock on the morning of the famous battle on 13th October, 1812, and a cairn of granite boulders has been erected to mark the spot, upon which the Lundy's Lane Historical Society have obtained permission to place a suitable memorial tablet.

On the crest of the Heights, a short distance west of the monument, a new rustic shelter has been built with paths leading thereto; as this small structure occupies a commanding view point and is at the same time well sheltered by foliage it has been very much appreciated by visitors. A new path has also been constructed along the face of the heights a short distance below the crest level, with resting places at frequent intervals. This walk is shaded from the sun and several prospects of the Niagara river and valley have been opened out.

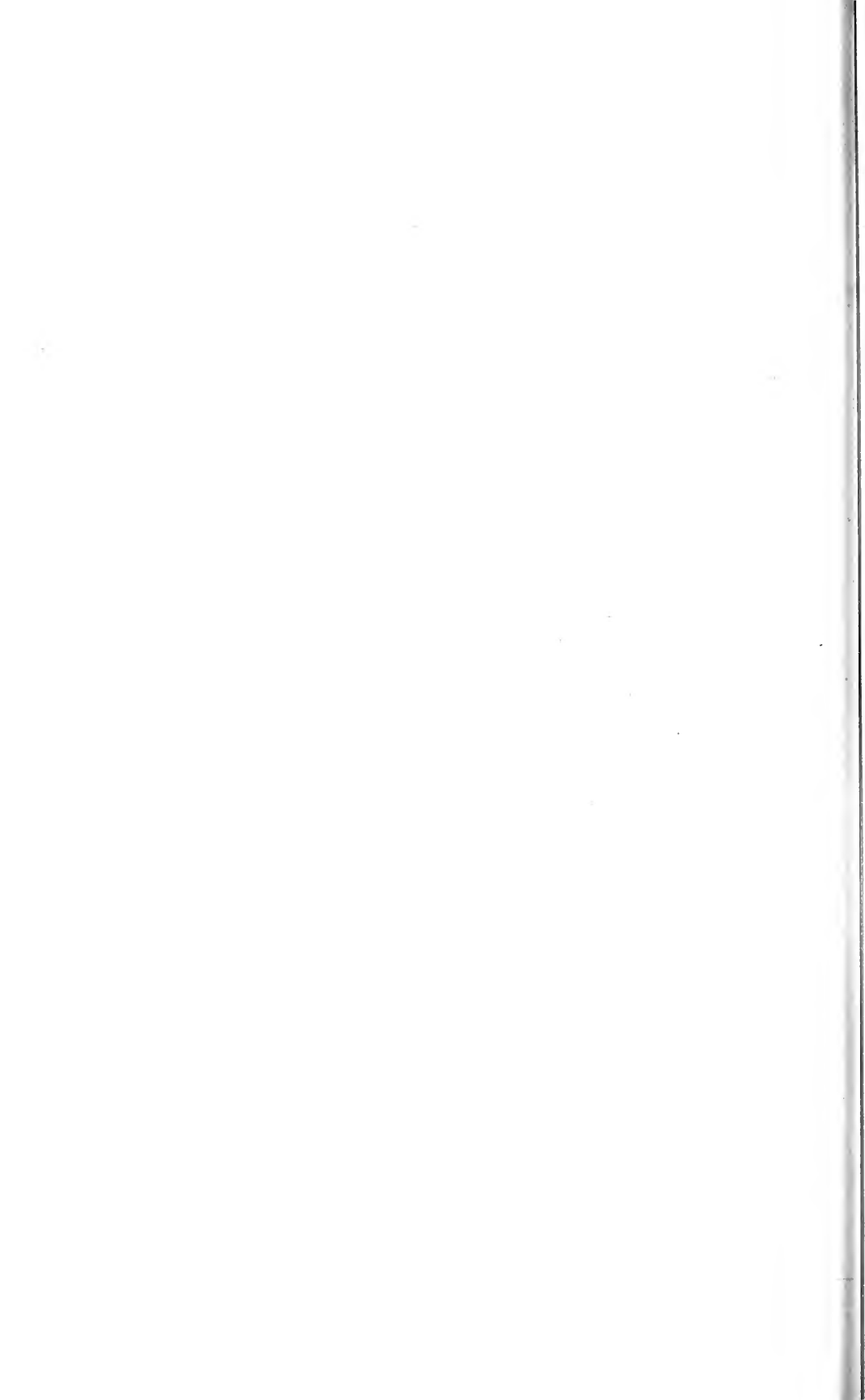
As numerous picnic parties now visit Queenston Heights, some of them being large Sabbath School and Church excursions, it would be advisable to provide additional shelter accommodation. This should be constructed of permanent materials in order to avoid yearly repairs in maintenance.

Niagara Glen continues to attract visitors in increasing numbers. All the paths and stairways have been maintained in good condition and some new paths made to facilitate access to points of interest. A new cedar work shelter was built at the entrance to the Glen to provide cover in case of storms, and the picnic pavilion near the river was provided with rustic seats and tables. A cyclone which struck across the Glen in August did considerable damage to the foliage, but as its force was confined to narrow limits, and the undergrowth was vigorous, the resultant effect will not be observable in the course of another year.

The heavy storms and high water have greatly damaged the path along the water's edge near the spring. This will require general renewal in the early part of next season.

All of which is respectfully submitted.

JAMES WILSON,
Superintendent.



REPORT
OF THE
Minister of Public Works
FOR THE
PROVINCE OF ONTARIO
FOR THE YEAR
1906

PRINTED BY ORDER OF
THE LEGISLATIVE ASSEMBLY OF ONTARIO



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1907

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TORONTO

REPORT
OF THE
Minister of Public Works
FOR THE
Province of Ontario

For the Year ending 31st December, 1906.

To His Honour WM. MORFIMER CLARK, K.C.,
Lieutenant-Governor of the Province of Ontario.

Sir :

I have the honour to submit to you, as required by statute, the annual report on all works under the control of the Public Works Department, comprising the reports of the Architect, the Engineer, the Superintendent of Colonization Roads and the Accountant and Law Clerk, for the year 1906.

I have the honour to be,

Sir,

Your obedient servant,

J. O. REAUME,
Minister of Public Works.

Department of Public Works,
Toronto, 1st February, 1907

WARWICK BROS & RUTTER, Limited, Printers,
TORONTO.

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REPORT

OF THE

Deputy Minister of Public Works.

*To the Honourable J. O. REAUME,
Minister of Public Works, Ontario.*

SIR,—I have the honour to transmit to you the accompanying annual reports for the year 1906 of the Provincial Architect, the Provincial Engineer, the Superintendent of Colonization Roads, and the Accountant of the Public Works Department.

THE ARCHITECT'S BRANCH.

Under the Architect's Branch there has been carried out during the year numerous extensions, improvements and repairs, in connection with a number of buildings and institutions under the control of the Province, viz.: The Parliament Buildings, Government House, Osgoode Hall, Toronto Asylum, Mimico Asylum, London Asylum, Hamilton Asylum, Kingston Asylum, Brockville Asylum, Penetanguishene Asylum, Woodstock Asylum, Orillia Asylum, Ottawa Model and Normal School, the Toronto Normal and Model Schools, London Normal School, Belleville Institute for the Deaf and Dumb, Brantford Institution for the Blind, and the Ontario Agricultural College at Guelph.

The work in connection with these institutions included remodelling and refitting, the renewal of heating, plumbing and water supply systems, the construction of roadways, sidewalks and the usual minor repairs. At the Woodstock Asylum two new cottages to accommodate eighty patients are in course of erection, and will be ready for occupation this year (1907).

At the Kingston Asylum a new laundry building was erected, and plans and specifications have been prepared for a new Industrial Building. The heating plant of the Hamilton Asylum has been renewed and enlarged, and the plumbing system of the Ottawa Normal School was wholly renewed. A system of mechanical ventilation has been installed in the Toronto Normal School, and is proving most satisfactory. London Asylum has been provided with a new boiler plant, also a railway switch and an approved coal handling equipment.

At Osgoode Hall there has been installed an adequate system of fire protection, and a new greenhouse was erected at Government House. Cottage Number 2 at Mimico Asylum, destroyed by fire on December 31st, 1905, was rebuilt, and extensive improvements were made to the waterworks intake.

At the Guelph Agricultural College two cottages for farm foremen were built; also a farm mechanics' building, and an addition to the Chemical Laboratory. The college greenhouse was rebuilt. A glass house for insects, to be used in connection with Physics and Botany, and a new steel water tower and tank for the Macdonald Institute are in course of erection.

General repairs were made to the gaols, lock-ups and registry offices in the unorganized districts of the Province. A residence for the gaoler at Parry Sound was erected, and an annex of the court house has been remodelled. The gaoler's house and alterations to the gaol at North Bay have been completed. At Cobalt, there was built a lock-up, including living apartments for the chief constable, an office for the magistrate, a gaoler's room and cells. Lock-ups were also built at Haileybury, Markstay, Mines Centre and Powassan. An addition was made to the Ranger's House in Algonquin Park, and a refectory building erected at Rondeau Park.

Plans and specifications have been prepared, and tenders invited for the erection of Normal Schools at Hamilton, Stratford, Peterborough and North Bay. These buildings will be of good design, in the style of Italian Renaissance, will be provided with modern heating, ventilating and plumbing appliances, and will be well equipped in every particular. Provision will be made for manual training rooms, gymnasium, library, reading room, chemical laboratory, an art room, domestic science rooms, and an assembly hall, in addition to class and lecture rooms and offices.

ENGINEER'S BRANCH.

The Engineer's Branch has, during the year 1906, had charge of the construction and repair of bridges erected by this Department in northern Ontario: the locks, dams and bridges in connection with the navigable waters of Lakes Muskoka, St. Joseph and Rosseau, Mary's and Fairy Lakes, Maganawan River and Lake of Bays; and the inspection of railways, drainage and other works, aided and controlled by the Province.

Twenty-one bridges were built by the Department, and a considerable number renewed or repaired. Owing to the increasing price of lumber, and the inferior quality now obtainable, steel with concrete piers and abutments is being used to some extent. The completion of the steel bridges has been delayed in a few cases, by the inability of bridge companies to procure the steel. These bridges are being made of sufficient strength to carry a concrete floor.

Among the larger steel bridges is one at Webbwood over the Spanish River, having a central span of 170 feet, two end spans of 50 feet each, and trestle approaches, making the bridge 465 feet in total length. At Goulais River in Fenwick Township a steel bridge is being built with two spans of 102 feet each. Over the Veuve River at Verner a steel bridge was built of 120 feet span with concrete abutments. A steel bridge on concrete substructure was completed at Bracebridge of 190 feet span, and another at Bala of three spans, 75 feet, 45 feet and 25 feet. The Mattawa Bridge with concrete piers and abutments, and steel superstructure in two spans of 100 feet and 112 feet, is in course of erection. A small concrete arch was built near the Town of Rainy River. At Massey, over the Sauble River, a reinforced concrete arch of 100 feet span, is in course of erection. This will be the longest span concrete arch in Canada.

The wharf at Port Curling was extended for the accommodation of steam and gasoline launches. The work of cribbing above the locks on the Mary's

and Fairy Lakes works, commenced in 1906, was completed. A contract has been let for the steel superstructure of the bridge over the Muskoka River which was raised to permit navigation of the river. On the Magnetawan River a channel was dredged to permit navigation from Lake Abmie to Beaver Lake. The Lock-Masters' returns of lockages on these waters show a total of 6,215 steamers, 1,162 small boats, 1,315 scows, and 392 rafts or cribs of timber.

Under the Drainage Aid Act, whereby Provincial aid is granted to the construction of expensive drainage outlets, which the property benefited could not otherwise afford, assistance was granted to ten works, whereby 55,223 acres were benefited, a considerable area being swamp lands and wholly reclaimed.

Railway construction has been exceptionally active during the year. The Temiskaming and Northern Ontario Railway, owned and operated by the Province, was extended from New Liskeard to Englehart, a distance of 25 miles, and is under construction for a further distance northward of 75 miles.

The Canadian Pacific Railway is completing extensions aggregating 352 miles, the more important of which are the lines from Kleinburg to Sudbury, and from Guelph to Goderich. The main line from Fort William to Winnipeg is being double tracked.

The Canadian Northern has completed a line from Toronto to Parry Sound, and has under construction an extension from Parry Sound to Hutton Township, North of Sudbury.

The Transcontinental Railway has made surveys for their lines across the northern part of the Province from the eastern to the western boundaries. Portions are under construction, and tenders are being taken for additional sections.

The net result is that there is now in operation 7,605.7 miles of steam railways within the Province and 1,591.14 miles are under construction. In addition there are 27 electric railways, with a total of 464.92 miles in operation, and 84 miles under construction.

With a view to the more complete regulation of the waters tributary to the Trent Canal, the Department of Railways and Canals, Canada, in the year 1904 made formal application to this Department for the transfer to the Government of Canada of the several dams, locks and other works erected by the Province on those waters. As a result of negotiations in this regard, an agreement was reached, and the transfer was made, subject to suitable conditions, the Dominion Government assuming control by an Order of the Privy Council on the 16th February, 1906.

COLONIZATION ROADS.

The report of the Colonization Roads Branch shows a total expenditure during the year of \$219,559.37 for colonization roads. About 220 miles of new roads were cleared and graded; over 750 miles were repaired, drained and improved, and bridges totalling 3,100 feet in length were constructed.

The necessity for building wagon roads through New Ontario is not easily realized by the citizens of the southern part of the Province, who have not made a study of the situation. Conditions in Northern Ontario are to-day somewhat similar to those of older Ontario a century ago. At that time it was necessary for the Provincial authorities to open trunk roads such as the Governor's Road from Hamilton to London, Yonge Street, leading northward from Toronto: the Danforth and Kingston Roads, leading easterly. Some were military roads built by soldiers, while others were built by contract. The Canada Company opened roads through the Queen's Bush. Large Pre-

vincial grants were made to other roads, and later toll road companies were formed to build and improve roads.

Roads are necessary to the occupation of the land. The work becomes especially urgent in a timbered country such as Ontario. This is one prominent reason why the colonization of Northern Ontario lags behind that of the prairie provinces where a vehicle can be driven in any direction across country.

A country without means of access is useless. Until wagon roads and railroads are built, giving transportation to and from it, land has no value. A farm ten miles from Toronto, without roads leading to it, could produce nothing. Within Northern Ontario, more especially north of the Canadian Pacific Railway and north of the Height of Land, is an immense territory valuable for its timber, mineral and agricultural resources. The greater part of it has remained unoccupied until the present time, except by Indians and fur traders.

Year by year the Provincial Government has been opening up wagon roads and extending the frontier of civilization mile after mile; just as, a century ago, the Governor's Road and Yonge Street were constructed in older Ontario. More recently, the construction of the Temiskaming and Northern Ontario Railway, and the projection of the Grand Trunk Pacific Railway, promise a more speedy development of this great heritage. The work of constructing colonization wagon roads is arduous, but until they are built the country must remain a wilderness.

Colonization roads may be roughly divided into three classes: (1) Trunk roads leading into new districts that are wholly unoccupied; (2) Shorter branch roads into sections recently or sparsely occupied; (3) Roads connecting settlements through rough and rocky districts unfit for occupation.

The trunk roads of class one are at present being required principally in the Temiskaming District as adjuncts to the construction of the new Government railway, and, as far as practicable, are being built by contract. In the Rainy River and Algoma Districts provision is also being made for a similar class of work to meet requirements of settlement. The second class of roads, branch roads, are built, aided or improved as occasion requires throughout the entire northern district; while class three, or connecting roads, belong very largely to Parry Sound, Muskoka, and generally the territory between Georgian Bay and the Ottawa River; also in the remaining districts where fertile areas are separated from the railways and from one another by rocky ridges unfit for cultivation. While occupants of the last mentioned class are able to maintain roads past their own farms, they are in many cases not yet able to open and keep in repair the roads through adjacent unoccupied and barren districts, that are necessary to enable them to reach a market or shipping point.

As settlement increases and pioneer conditions pass away, the roads through continuously fertile lands become self-supporting. In the more broken and rocky districts assistance is required for a longer period.

All of which is respectfully submitted.

I have the honor to be,

Sir,

Your obedient servant,

A. W. CAMPBELL,

Deputy Minister Public Works.

PARLIAMENT BUILDINGS,
TORONTO, 31st January, 1907.

REPORT OF THE ARCHITECT.

TORONTO 5th January, 1907.

To the Hon. J. O. REAUME,
Minister of Public Works, Ontario.

SIR,—I have the honor to submit the following annual report on the buildings erected, contracts being carried out and repairs, improvements, etc., made to the various Provincial buildings under the Architect's Branch for the year ending Dec. 31st, 1906.

GOVERNMENT HOUSE.

A greenhouse 22x75 ft. with potting shed attached has been erected on the grounds to the north of the old greenhouse, and for which plans and specifications were prepared, tenders called for and contract for the erection of the building awarded to Mr. T. V. Gearing, of Toronto. Tenders were also received for heating same and the contract awarded to the Fred. Armstrong Co., of Toronto. The work has been satisfactorily completed. Considerable repairs had to be made to the boundary fence on King, Simcoe and Wellington Sts. Tenders were called for painting the fence and the contract awarded to Mr. John Stewart, of Toronto. The work has been properly done. Repairs to buildings generally have been attended to. Furniture and furnishings were supplied as were found to be necessary.

PARLIAMENT BUILDINGS.

Ordinary repairs have been made to the buildings, including repairs to the heating, plumbing and electric light plants; all of which have been kept in good condition. A contract for painting the walls and ceilings of the corridors was awarded to Mr. A. M. Browne, of Toronto, after tenders had been duly received. The work is nearly completed. Vault fittings and furniture have been supplied to the various departments as required.

OSGOODE HALL.

An alteration has been made on the ground floor of the north side of the central building. The room formerly occupied by the clerks of the Surrogate Court office has been divided into two rooms, giving a private office for the Surrogate Clerk. The office formerly occupied by him being required for one of the Judges. The rooms have been suitably painted and furnished. The change was occasioned by the necessity of providing accommodation for the Judges of the Exchequer Court. With the same object in view, and of relieving the overcrowded condition of the building, preliminary drawings were prepared for an addition to the west wing. Appliances for the improvement of the fire protection in the buildings have been installed, including twenty-five hydrants, suitably placed with hose attached to each and ready for operation, on the Government side of the building. The Law Society have also installed in that portion of the building controlled by them twenty hydrants with hose attached. Twenty-five chemical hand fire extinguishers have been placed on the Government side of the building. With this equipment, and considering the close proximity of the buildings to the city fire department's station (about two blocks distant on Bay St.), I consider the buildings to be well protected from fire, provided it is watched at night. The usual amount of repairs

have been made, consisting of repairs to roofs, plastering and painting; some of the Judges' rooms have been papered and decorated. The walls and ceiling of the Chancery Division Court in the west wing have been painted. Tenders were received and the work awarded to Mr. A. M. Browne. Plans and specifications were prepared, tenders received and contract awarded to the Canada Cabinet Co. for vault fittings to be placed in the vault in connection with the central office on the ground floor. A local interchanging telephone system has been installed in the apartments of the Judges of Common Pleas Division, and has been found to work satisfactorily. The buildings throughout have been kept in good repair.

TORONTO ASYLUM.

Ordinary repairs to the exterior of the buildings have received the attention of the Department. In view of the proposed removal of the Institution to a more desirable location, in the near future, only such repairs as were indispensable were made. Other repairs to the Institution were attended to by the Asylum staff.

MIMICO ASYLUM.

Cottage No. 2, which was damaged by fire on the night of Dec. 31st, 1905, has been rebuilt. All of the work except slating, galvanized iron work and metal ceilings was done by Asylum labor, with the help of a few mechanics, under the foreman bricklayer and foreman carpenter and the engineer of the Institution. Plans and specifications were prepared by the Department and tenders called for. As the tenders were found to be too high, and it was deemed advisable to have the work done by Asylum staff under the supervision of the Medical Superintendent of this Department. The result has been most satisfactory; the work being thoroughly well done and at a very reasonable cost to the Province. A number of improvements have been made in the building, including the rearrangement of the pantries, plumbing and electric lighting, which has the effect of making this cottage much superior to the others in connection with the Institution. I would recommend that the same improvements be gradually made in the other cottages at the rate of about two per year. In this way the work could also be done by Asylum labor, which would save expense and provide suitable and beneficial employment for the patients. Repairs to the waterworks intake pipe in the lake were continued during the season, and have been completed for some time. The work has been satisfactorily done, and I have been informed the water supply, since these very necessary repairs were made, has been all that could be desired. The contract for the roofing and metal ceilings was awarded to Messrs. Douglas Bros., of Toronto, who did the work in a satisfactory manner. Repairs in general to this Institution have been attended to by the Asylum authorities.

LONDON ASYLUM.

Plans and specifications were prepared and tenders called for and contract awarded to the Polson Iron Works Co. for installing two 100 h.p. tubular boilers to take the place of four small boilers, which were worn out. The boilers have been set up in place and the contract nearly completed. Repairs were made to the boilers and laundry machinery as re-



Nurses' Home, Kingston Asylum

quired. A switch has been run from the Grand Trunk main line through the grounds in the rear to the coal vaults of the main building, which had recently been put in a thorough state of repair by the Asylum authorities. The coal is conveyed by the cars and dumped into the vaults, which means a great saving in labor in handling the coal and the expense of teaming. The usual amount of repairs have been made to the slating, galvanized iron work, etc., of the various buildings. An amount was asked in the estimates last year for installing electric light in this Institution, which at present is lighted by gas, and specifications were prepared and tenders received for the plant, but pending the report of the Power Commission, it was deemed advisable to defer the matter.

HAMILTON ASYLUM.

Ordinary repairs have been made to the roofs, etc. Considerable headway has been made in connection with the enlarging of the steam mains of the heating plant in the main building; the system is antiquated and out of date, and has been added to from time to time as additions have been made to the building; the additions causing an increased number of mains and returns, which were put in without any general plan or system. The change, which is being made, will do away with all small mains, and instead of several there will be one large main and return, which will give a more even flow and require less steam, and consequently save fuel. The work will be continued and completed after the plant is shut down next year. Plans and specifications were prepared and contractors invited to tender for two 100 h.p. boilers to replace three boilers, which had been condemned as unsafe and unfit for service. The contract was awarded to the Polson Iron Works Co., of Toronto. The work has been satisfactorily completed. Plans and specifications were also prepared for a 75 h.p. boiler to replace an old boiler, which was condemned as unfit for further service, in the pumping station on Queen St., in connection with the water supply service of the Institution. The contract was awarded to the John Inglis Co., of Toronto, after tenders had been duly called for; this work has also been satisfactorily completed. Repairs to boilers and machinery in this building have been given proper attention. It was found necessary to renew the felt and gravel roof over boiler-room, which was leaking badly and past repairing. Repairs have also been made to the main sewer down the side of the mountain. Cement walks have been laid from the entrance gates to the main building and to Orchard House and the Medical Superintendent's residence. A new three inch main supply water pipe has been laid to the fire hall and East House.

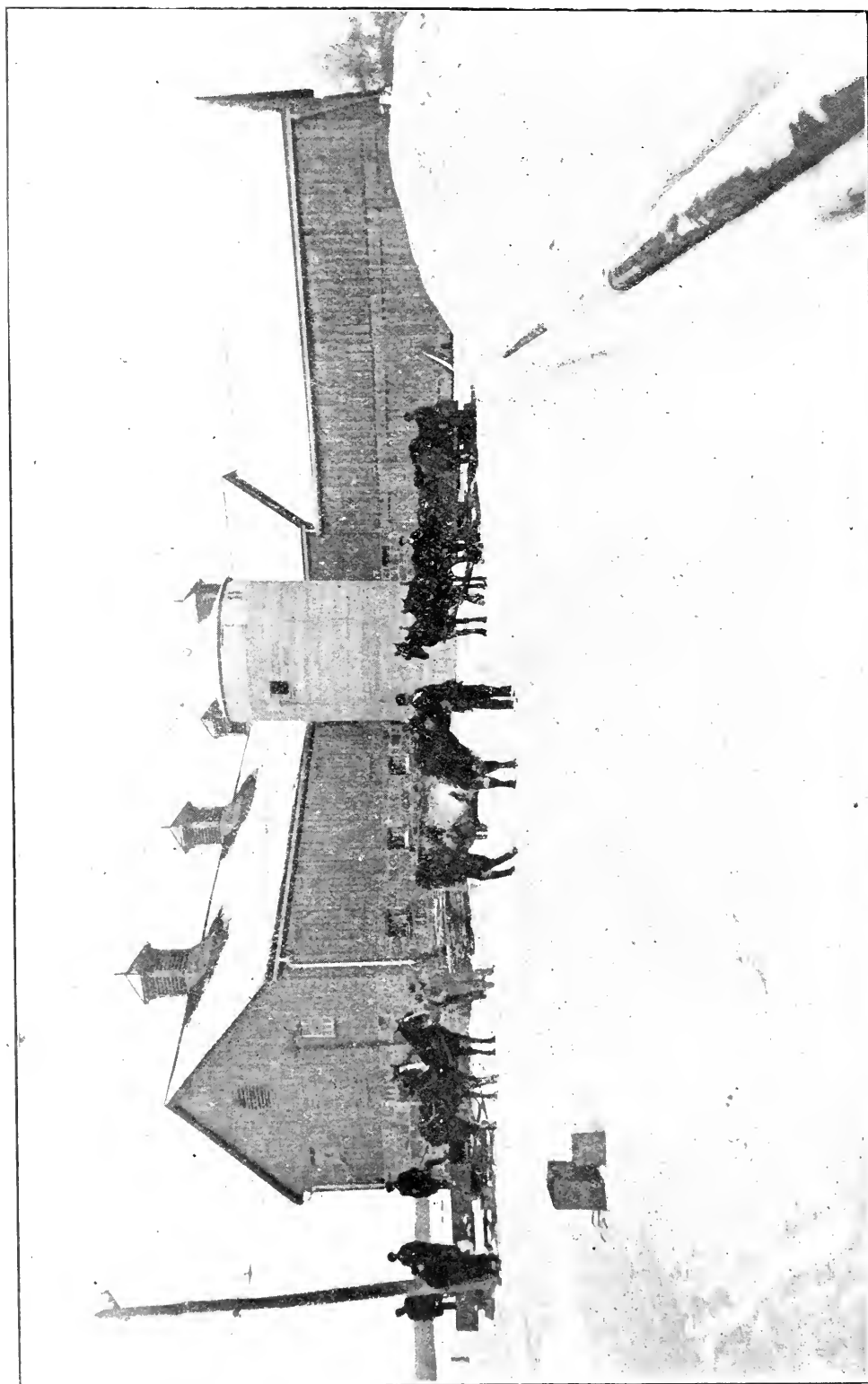
KINGSTON ASYLUM.

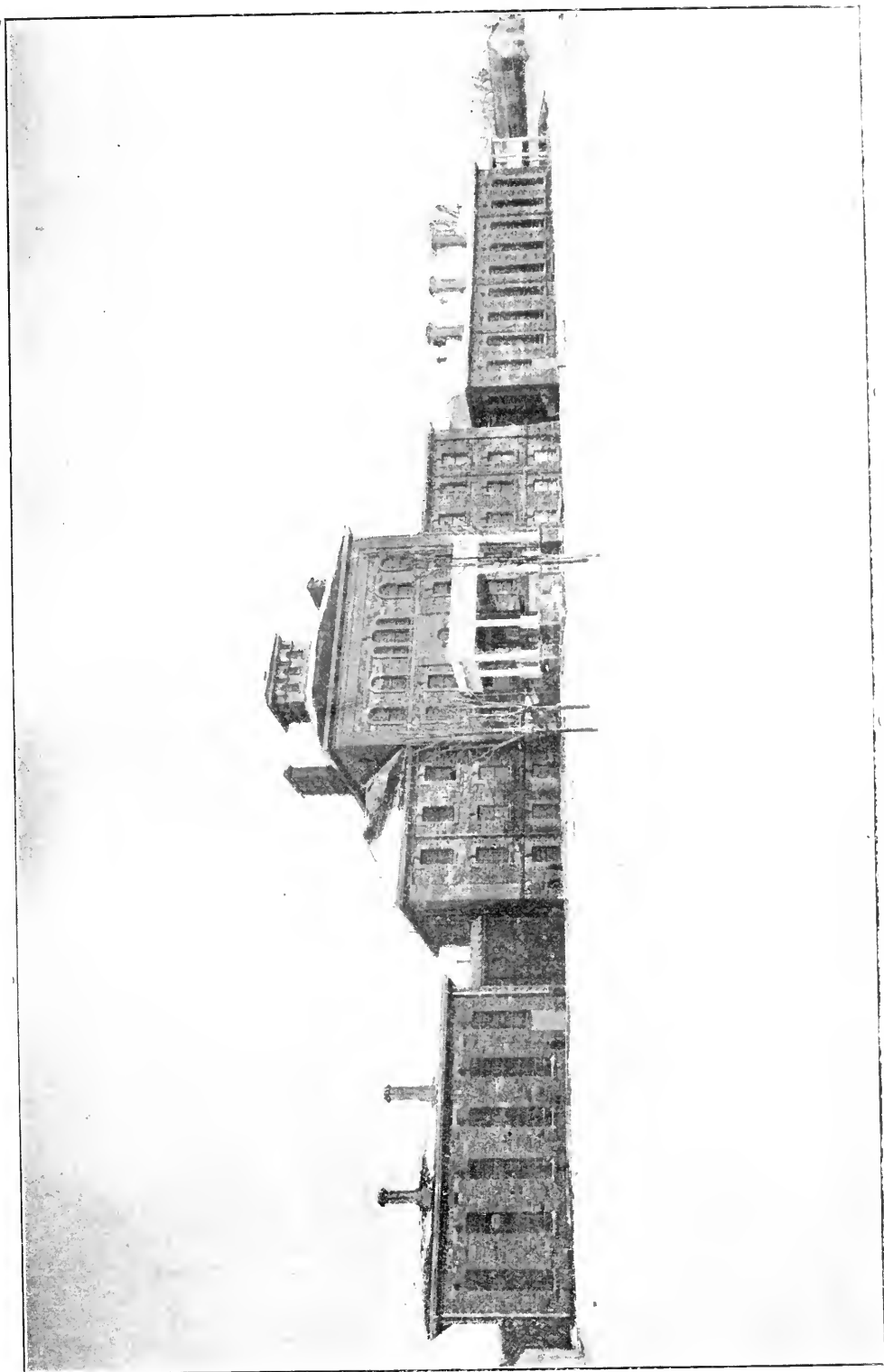
The laundry building at this institution, which was damaged by fire on the night of Feb. 9th, has been rebuilt. Plans and specifications were prepared and tenders received and the contract awarded to Mr. R. N. F. McFarlane, of Kingston, who has completed the work in a most satisfactory manner. The building has been remodelled throughout. The laundry proper being supplied with additional and up-to-date machinery, including two washers, mangles, wash trays, etc., which were installed by the engineering staff of the Institution. The ironing and drying rooms have been enlarged. Considerable improvement has also been made in the sanitary conveniences and heating in connection with this building; this work

has also been done by the engineering staff. Plans and specifications were prepared for a building to be known as the Industrial Building, which will be located close by the laundry. It has been planned to give accommodation for a tailor shop and shoe shop, which were formerly located in the laundry building. The building will also include a mattress and brush shop on the ground floor and the upper floor will be used as a sewing room for the women patients, with a separate stairway leading thereto; the ground floor being used by the men patients only. The excavations have been made by the patients and it is proposed to do the stone work, galvanized iron work and roofing by contract, and the carpenter work, plastering, painting, plumbing and heating mostly by Asylum labor. The roof over the boiler-house, which was destroyed by fire Feb. 27th, has been rebuilt and much improved. The plans and specifications were prepared by the Department and the contract awarded to Mr. R. N. F. McFarlane, after tenders had been duly received. This work has also been completed in a satisfactory manner. Plans and specifications were prepared for fitting up the attic in the Nurses' Home, providing accommodation for about eight nurses. The rooms are spacious and cheerful. The work was done satisfactorily by Asylum labor under the chief carpenter of the Institution. A large amount of other work has been done in connection with the numerous buildings of this Institution by Asylum labor, including the fitting up of a large root-house near the main building, which was commenced some years ago but for some reason never completed, and with the root-house at the farm near the stable buildings, which has also been put in a good state of repair, should give ample accommodation for the stuff grown on the premises. Repairs were also made to the piggery, cow stables and slaughter houses. Considerable repairs have been made to the wharf and breakwater, a large amount of timber being decayed. A new feed water pump to boilers has been supplied to replace an old one. Some slight repairs have been made to the boilers.

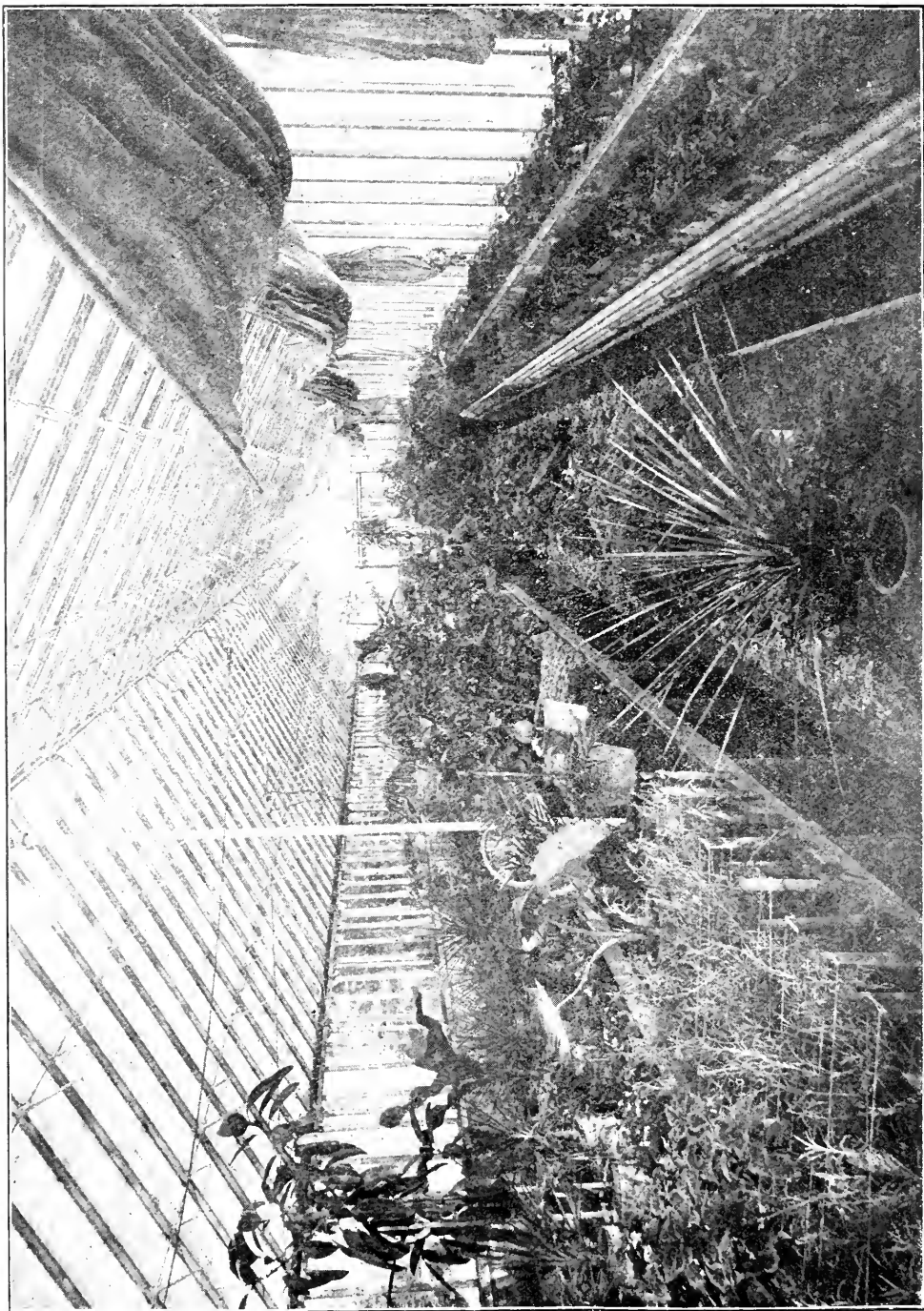
BROCKVILLE ASYLUM.

The only new building, in connection with the Institution, erected this year was a new root-house, which has been built in a convenient location near the main building; the contract was carried out by Mr. P. McLaren, of Brockville, to whom the work was awarded after tenders had been received. Repairs were made to the brickwork, roofs, etc., of the buildings. An additional hot water boiler was installed in each of the six cottages to improve the heating apparatus in these buildings, and is working satisfactorily. The work was done by Messrs. Ross & Co., of Brockville, the contract being awarded to them after tenders had been received. A fire escape has been placed in the rear of the executive building to improve the means of escape for the persons occupying the upper floors of that portion of the building. An extension has been added to the skating rink to increase the space in waiting rooms and a gallery over them to give an opportunity to the patients who do not skate of watching the others amusing themselves in that way; the work has been done by Asylum labor. Shelters have been erected over the weigh scales; the work mostly being done by Institution labor. Repairs have been made to the plumbing appliances, boilers and laundry machinery as were found necessary. Ordinary repairs to the building has been attended to. Plans and specifications were prepared for 100 h.p. boiler for high pressure work, tenders received and the contract awarded to the Polson Iron Works Co., of Toronto. The boiler





Main Building, Asylum for Insane, Penetanguishene.



Green House, Asylum for Insane, Pentanguishene.



Cottage 3 Woodstock Asylum.
(Cottage 4 same as Cottage 3.)

has been delivered and will be put in place as soon as the necessary changes can be made in the boiler-house to make room for it. A boiler feed pump has been installed, replacing the old one. A feed water purifier has been placed in one of the boilers with the object of dispensing with the use of purgatives. An exhaust fan has been supplied to laundry to remove the steam from the laundry and odors of cooking from the kitchen. The sanitary appliances in the executive building, which were out of order and used up have been replaced; the work was done, under contract, by Messrs. Ross & Co., of Brockville.

PENETANG ASYLUM.

Plans and specifications were prepared for a two-story verandah or balcony, which has been erected, at the end of the main building on the women's side, fitted with moveable sashes, so that they can be enclosed and used for sun rooms in the cold weather. Plans and specifications were also prepared for a large portico, which has been erected in front of the main entrance to the building. The building to the rear of the main building, formerly used as a paint and shoe shop by the Reformatory, has been made into a dormitory on the upper floor and a sitting-room on the lower floor and will be used by men patients working on the outside. Lavatories have been fitted up on each floor. The building is heated from the boilers in connection with the laundry. General and usual repairs to the buildings have been attended to. The root-house has been practically rebuilt and a cement silo constructed adjoining the barn. A large amount of work has been done in repairing the coal docks, removing weigh scales and placing shelters over same, road making and walks; the whole of the work with the exception of plumbing and repairs to roofs and the preparation of the materials was done by Asylum labor under the supervision of the Medical Superintendent, and is a credit to all concerned.

WOODSTOCK ASYLUM.

Plans and specifications were prepared for two cottages to accommodate eighty patients, to be erected in connection with the Institution, and which are similar in most respects to the two cottages completed last year. Contractors were invited to tender and the work awarded to the Fisher Co., Ltd., of Brantford. One of the buildings is nearly completed and the other roofed in; both should be ready for occupancy early in the summer. A large amount of work has been done in the laying of drains in connection with the sewage and drainage of the buildings and in grading the grounds; the materials were purchased by the Department and the work done by day labor under the Clerk of the Works. The temporary board walks, which were laid from the main building connecting with the cottages, have been removed and replaced by cement walks. The work having been done, under contract, by Messrs. Nagle & Mills, of Ingersoll, who have also laid cement walks, under contract, from the city limits to the front of the administration building. Plans and specifications were prepared for a barn 45 ft. x 80 ft.; the lower portion to be constructed of concrete and stone and the upper portion of wood framing. The lower portion will be used for stabling horses and cattle. Tenders were called for and the contract awarded to Messrs. Nagle & Mills, of Ingersoll. The building will be completed early in the season. It is proposed to build a silo adjoining this barn next season.

ORILLIA ASYLUM.

Ordinary repairs to the buildings have been attended to. Two of the underfeed stokers, which were out of service for some time, have been repaired and put in order. Automatic attachments have been placed in these stokers; the work being done by the Jones Underfeed Stoker Co., of Toronto. Repairs have been made to the boilers, the work was done by the employees of the Institution. The skating rink has been enlarged by increasing the width, the work being done by the Asylum authorities.

MODEL AND NORMAL SCHOOL, OTTAWA.

Plans and specifications were prepared for renewing nearly all of the old plumbing appliances in the Normal and Model Schools, which in many cases were beyond repair and in danger of becoming unsanitary. Tenders were called for and the work awarded to Messrs. McKinley & Northwood, of Ottawa, who have completed their contract in a satisfactory manner. The work installed consisted of up-to-date sanitary apparatus, including lavatories, w.c.'s, etc., and drinking fountains placed in the class rooms. The planking in the play yard on the north side of the Model School has been renewed, the work being done by Mr. S. J. Davis, of Ottawa, to whom the contract was awarded after tenders had been received. The play yard on the other side was replaced last year, which now leaves all of the play yards in good condition. The walls and ceilings and woodwork of two of the class rooms in the Normal School and two in the Model School have been painted and grained and new hardwood floors laid. Radiators have been placed in the Assembly Hall to improve the heating of the room. Repairs were made to the roofs as required from time to time. Repairs to the boilers and steam heating apparatus have also been attended to.

NORMAL AND MODEL SCHOOLS, TORONTO.

Embossed sheet metal ceilings have been placed on the ceilings of the west end of the Model School on the ground floor, some of the plastering having given evidence of falling. The old plaster ceilings of this building are gradually being replaced by metal: it is proposed to continue this work next year. The walls and ceilings of some of the class rooms in the Normal Schools have been painted, and repairs to the building generally have been attended to. A mechanical system of ventilation has been installed in the Normal School, the work being done, under contract, by the Fred. Armstrong Co., of Toronto. The system ventilates all of the rooms; the fresh air being brought from the outside over indirect heating coils by means of a blower, operated by a 12 h.p. motor with automatic regulator for controlling the speed of fans, and is discharged through galvanized iron ducts to the various rooms, creating a pressure which forces the foul air out at the floor line through ducts leading to a ventilator in attic and through this to the atmosphere, making a complete change of air in various rooms every ten to fifteen minutes; the supply being regulated by thermostatic control. The apparatus is proving most efficacious and is a great boon to the occupants of the class-rooms. It is proposed to install a similar system to this in the Model School next year, which is in the same condition as the Normal School was before the system was installed, i.e., without ventilation of any kind. To operate the motors in connection with the ventilating system it was necessary to put in a new electric service, which

has been done by the Toronto Electric Light Co., connecting with their service on Gould St., the wires being laid in conduits underground. Owing to a large proportion of the feed wires in the Education Department building and Model and Normal Schools being old and cut-offs, fuses and insulators being of a kind not now approved by the underwriters, as a protection against fire, it will be necessary to renew most of this work next year. The fence around the grounds has been painted, the work being done, under contract, by Mr. John Stewart. The room formerly occupied for museum purposes in the central portion of the Education Department building on the first floor has been converted into two rooms to be used as a private office and work room respectively by the curator of the Museum, being divided by a passageway. The rooms have been properly painted and lighted. The work was done, under contract, by Mr. T. V. Gearing, of Toronto. About the usual amount of repairs have been made to the buildings, including boilers and plumbing appliances.

NORMAL SCHOOL, LONDON.

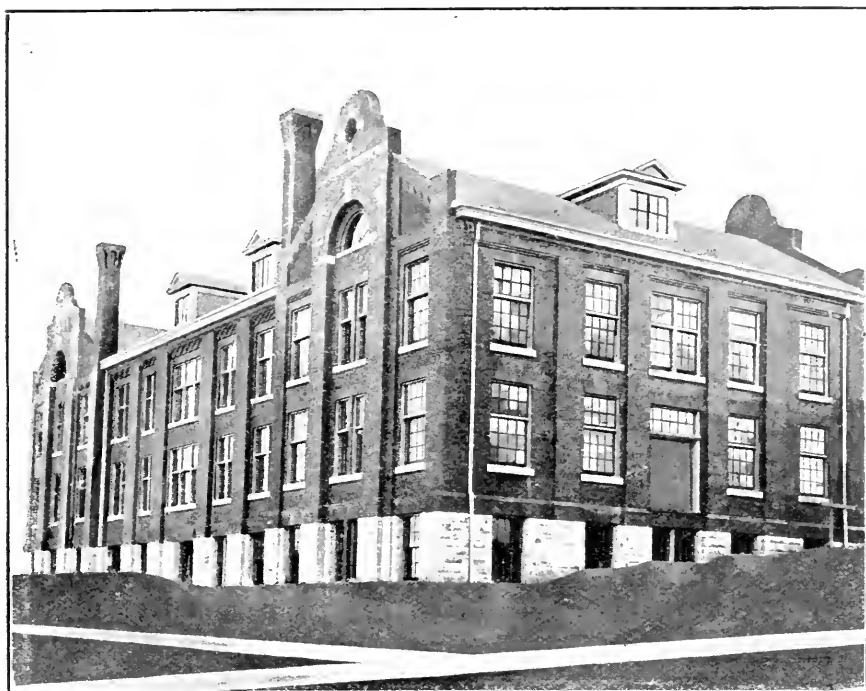
The walls and ceilings of nearly the whole of the interior of the building, which had not been painted since its erection, were painted by Mr. Richard Booth of London, who did the work under contract, in a satisfactory manner. Ordinary repairs have been made to the building when found to be necessary.

INSTITUTION FOR THE DEAF AND DUMB, BELLEVILLE.

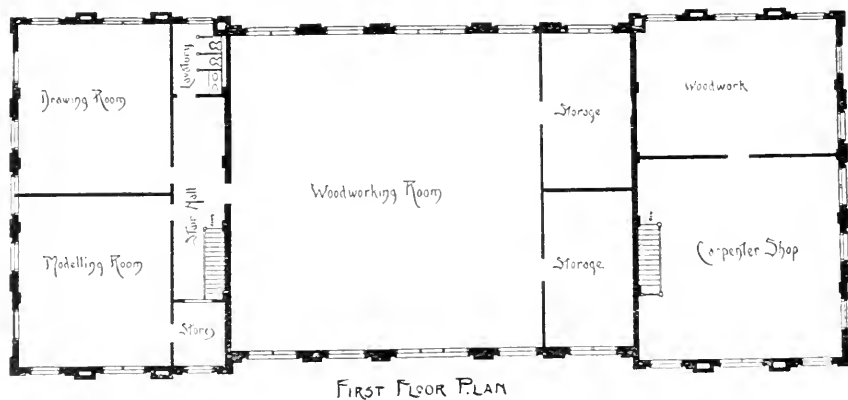
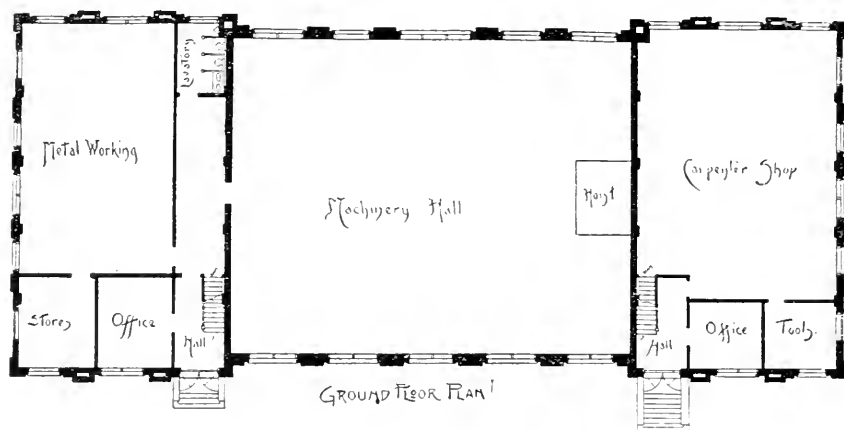
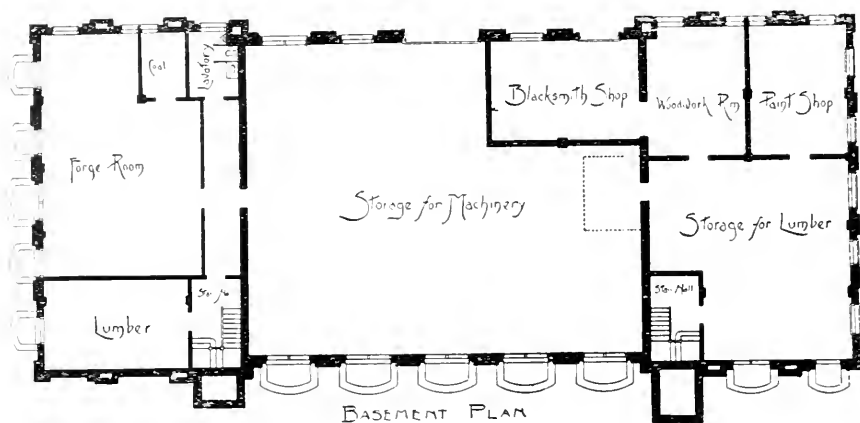
The old wooden walks leading from the main entrance gates to the main building have been removed and replaced by cement walks; the work was done by Messrs. Dolan & Son, contractors, of Belleville, who were awarded the contract after tenders had been duly called for. Repairs were made to some of the laundry machinery, including renewals of belting and shafting. Repairs were made to the brick setting of boilers. Tenders were called for and the contract awarded to the John Lewis Co., of Belleville, for a new hot water heater, which has been installed in the boiler room to take the place of the old one, which was past repairing. The heater is working satisfactorily. Tenders were also called for for a compound condensing engine for operating the laundry machinery, and the contract awarded to the A. R. Williams Machinery Co., of Toronto. The engine has been installed and is giving entire satisfaction. A new starch boiler has also been provided for use in the laundry. Much needed repairs and improvements were made to the coal shed by enlarging the entrances and placing new doors so that teams can be driven through. Repairs were made to the roofs of the various buildings, including a new sky-light over the Chapel roof; the woodwork of the old one having been found to be very much decayed and not capable of sustaining the weight of snow, which would probably fall on it. Considerable repairs were made to the interior of the building, including flooring and replacing old plaster ceilings with metal. The hedge fence in front of the grounds has been improved by the planting of young trees, and the picket fence has been repaired and painted. Some painting was also done to the outside of the main buildings.

INSTITUTION FOR THE BLIND, BRANTFORD.

Plans and specifications were prepared for an ice house and the contract awarded to Mr. Jas. Wright of Brantford, after tenders had been duly called



Farm Mechanics Building,
Ontario Agricultural College, Guelph.



Farm Mechanics Building, Ontario Agricultural College, Guelph.

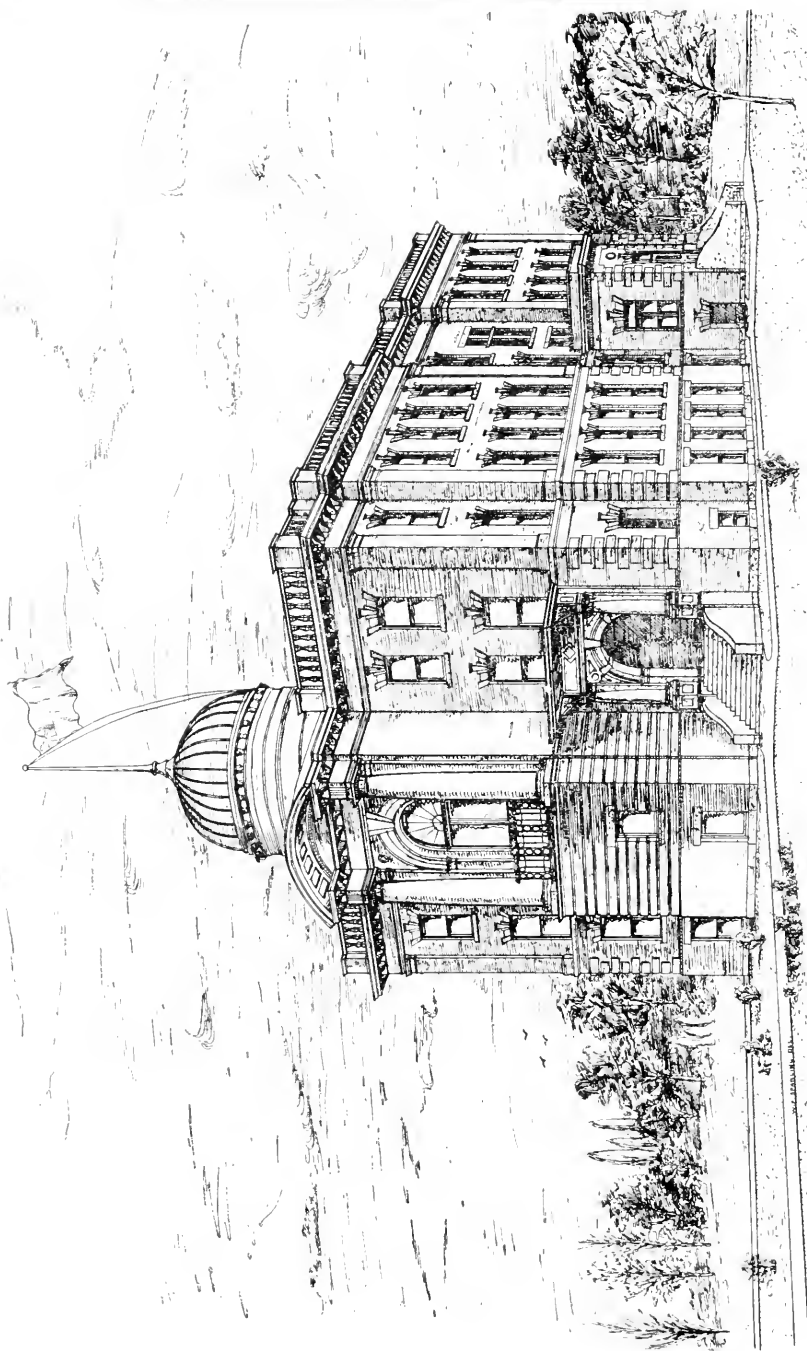
for. The work has been completed. A shed for housing implements has also been erected; tenders were called for same and the contract awarded to Messrs. P. H. Secord & Son of Brantford. Plans and specifications were also prepared for a verandah, which has been erected by the above firm, in front of the superintendent's residence; the contract being awarded to them after tenders had been received. The walk from St. Paul's Ave. approaching the main building, has been laid with cement for a distance of 319 feet, 6 feet in width; tenders were called for and the contract awarded to the Fisher Co., Ltd., of Brantford, who have done the work satisfactorily. Considerable plank walks were renewed, the work being done under the carpenter of the institution. Repairs to buildings generally have been made.

ONTARIO AGRICULTURAL COLLEGE.

Two cottages for farm foremen, for which S. F. Whitham of Brantford was awarded the contract, were finished early in the season. The Farm Mechanics' Building, which is being erected by the same contractor, is about completed with the exception of the heating and plumbing, which is being done by the engineer of the college. Plans and specifications were prepared for an addition to the Chemical Laboratory, and after tenders had been received, the work was awarded to Mr. S. F. Whitham of Brantford. This contract is also completed with the exception of the heating, plumbing and ventilating, which will be put in early in the year. Plans and specifications were also prepared for remodelling and rebuilding the college greenhouses. Tenders were called for and the contract for the foundations awarded to the Guelph Cement Brick Block & Paving Co. of Guelph, and the contract for the superstructure to the King Construction Co. of Toronto. The buildings have been completed and the heating apparatus installed by the engineer and staff of the college. Plans and specifications were also prepared for glass houses for insects to be used in connection with physics and botany, and which are being erected adjoining the Physiological and Biological Laboratories. The contract for the cement foundations was awarded to Mr. S. F. Whitham of Brantford, and the superstructures to the King Construction Co. of Toronto. These buildings are nearing completion. The cement foundations have been laid for a steel tank and tower to be used in connection with the water supply to the College, Macdonald Institute and Hall. A compressor pump to be used in connection with this work has been installed.

DISTRICTS.

General repairs have been made to the gaols and lock-ups and registry offices in the districts, and furniture supplied when found to be necessary. Plans and specifications were prepared for a house for the gaoler in Parry Sound, providing a kitchen for the gaol and a storeroom for the food supply. Plans and specifications were also prepared for brick veneering the old frame annex to court house, formerly used as a kitchen for the gaol and living apartments for the gaoler, and altering same into apartments for the officials. The contract was awarded to Mr. W. H. Clubbe of Parry Sound after tenders had been duly called for. The work has been completed in both buildings. The stonework of the fence in front of the court house has been repaired and the steps to the court house and gaol have been renewed with cement. The gaoler's house and alterations to gaol at North Bay, for which Messrs. R. Wallace & Son of that place were awarded the contract, were completed last spring. The contract for plumbing and heating being executed by Messrs. Richardson & Co. of North Bay. Electric light was installed by the North



Normal Schools, Hamilton, Stratford, Peterborough and North Bay.

Bay Electric Light & Power Co. Plans and specifications were prepared for a lock-up at Cobalt, including an office for the magistrate, a gaoler's room and six cells on the ground floor, and living apartments for the chief constable on the upper floors. Tenders were called for and the contract awarded to Mr. E. D. Pittam of Haileybury. The building has been completed and occupied for some time. Lock-ups for which grants were made in the estimates last year have been built at Haileybury, Markstay in Nipissing District, Mines Centre in Rainy River District, and Powassan in Parry Sound District.

ALGONQUIN PARK.

Plans and specifications were prepared for an addition to the Rangers' House. Tenders were called for and the contract awarded to Mr. W. D. Ritchie, Burk's Falls. The work has been completed.

RONDEAU PARK.

Plans and specifications were prepared for a refectory building, which has been erected for the convenience of the public; the work was done under contract by Mr. T. L. Buller, Ridgetown.

NEW NORMAL SCHOOLS.

Plans and specifications have been prepared by the Department for four normal schools to be erected in Hamilton, Stratford, Peterborough and North Bay respectively, as shown by the accompanying illustrations. The buildings will be four stories in height, including the basement. The design is in the style of Italian Renaissance, with a central tower in the front facade, surmounted by a dome, the main entrance being at the side of the tower, with an imposing portico of stone. The building from top of stone to the main cornice will be in brickwork, with stone string courses, capitals, columns, etc., with sufficient enrichments to give relief to the architectural lines, and when completed the composition will give an ornate and substantial appearance. The outside dimensions on the ground line are 78 feet frontage by 108 feet in depth. In the basement are located the heating and ventilating apparatus, three rooms for manual training, a gymnasium, janitor's room and men's toilet room. The ground floor is approached by the main entrance in front for the public and teachers, and an entrance at each side for the students, leading to a wide hall, extending through the centre of the building, with two spacious staircases leading to the upper floors. There will be upon this floor three class rooms, a library and a reading room, a room for the principal, an office for the secretary and two cloak rooms. On the first floor are located two class rooms, a lecture room, chemical laboratory, apparatus room, teachers' rooms, and two cloak rooms. The third floor consists of an assembly hall with a seating capacity for five hundred persons with ample exits at each end, an art room and two rooms for the instruction of domestic science. Contractors have been invited to tender and it is intended to commence work as soon as the weather will permit.

All of which is respectfully submitted.

I have the honour to be, Sir,

Your obedient servant.

F. R. HEAKES,
Architect.

REPORT OF THE ENGINEER.

To the Honourable J. O. REAUME,
Minister of Public Works, Ontario.

SIR,—I have the honour to report upon the construction of bridges, the repairs and improvements to the several locks, dams, etc., under the control of the Province; the improvement of rivers and streams and drainage works that have received aid from the Province, and the extension of railways in the Province of Ontario during the year 1906.

BRIDGES, RAINY RIVER DISTRICT.

Bridge at Rainy River.—A concrete arch, having a waterway 14 feet in clear width, and a height of 5 feet above low water, was constructed at the crossing of the Rainy River road by Miller's Creek, on lots 10 and 11, Township of Atwood, near the Town of Rainy River. The roadway is 16 feet in clear width, a concrete coping 4 feet 0 inches in height, forms a substantial and neat railing; wing walls 12 feet 6 inches in length and 8 feet in height above the water level retain the filling of the approaches.

The approach on the east side was graded for a distance of 480 feet, and on the west side for a distance of 570 feet, providing easy grades and making a permanent crossing of this stream.

Steeleman's Bridge.—A pile bridge, 128 feet in length and 16 feet in width, was constructed across a stream known as Buntin's Creek, on Lot No. 2, River Range, Township of Worthington. The bridge consists of 8 spans 14 feet, and one span 16 feet. The height of the bridge is 18 feet above the water level.

ALGOMA DISTRICT BRIDGES.

Goulais River Bridge.—The old bridge over the Goulais River, in the Township of Fenwick, had become so badly decayed that a new structure was necessary for public safety. A contract for a steel superstructure consisting of two spans, 102 feet each in length and 16 feet in width, heavy enough to carry, in the future, a concrete floor, was made in the month of August, 1906, but owing to the great demand for bridge and structural steel the contractor was not able to secure the materials to carry out his contract before the close of the year. The abutments and piers were completed ready for the placing of the steel in the month of November. They are constructed of piles, four rows in abutment and five rows in the pier at two feet centres. They are 22 feet 0 inches in length, and 22 feet 0 inches in height, and are sheathed with 3 inch planking.

Spanish River Bridge, Webbwood.—The large number of settlers in the Algoma District, south of the Spanish River, in the vicinity of Webbwood, have had very inadequate means of crossing the river to reach the town and railway connection. Up to the present they have been obliged to use a scow ferry, which is very inconvenient at any time, and is quite dangerous for many weeks, both before the ice is strong enough to use with safety, and before it breaks up and is gone in the spring. This condition has not only been a great handicap to the settlers who have gone in, but has seriously retarded the settlement of the country. An appropriation of \$7,500.00 was made at the last session of the Legislature to provide a bridge across the river at the Town of Webbwood. Objections were raised by those interested in the navigation of the river, particularly by the Spanish River Pulp Company, whose

mills are located at Espanola, about five miles further up the river, against the construction of a bridge that would interfere with the free navigation of the river. The plans of the structure, which provided for a clear headway of 15 feet 0 inches, were changed to provide a clear headway of 30 feet 0 inches above the ordinary high water of the river. This alteration materially added to the cost of the bridge.

The structure will consist of one centre span, 170 feet in length, and two spans 50 feet in length, of steel supported on steel pedestals, 21 feet 6 inches in height, which rest upon concrete piers 17 feet in height above the summer water level. A timber trestle approach, 140 feet in length, is provided on the west side, and 55 feet in length on the east side. The total length of the bridge floor is, therefore, 465 feet.

A contract has been let for the steel spans and pedestals for the sum of \$8,000.00. The substructure is well advanced, and it is expected the work will be completed about June next.

Sauble River Bridge, Massey.—Preparations have been made for the construction of a reinforced concrete arch of 100 feet span, over the Sauble River, near the Town of Massey. The materials for the concrete have been delivered at the site of the bridge, and the timber and lumber required for the centering and form work have been provided. The seats for the abutments of the arch have been blasted in solid rock and everything has been provided in readiness for pushing on the construction of the work as soon as the spring freshet has passed.

The total length of the bridge over the arch and the abutments will be 140 feet. The rise of the arch will be 24 feet, and the profile will be five centred about midway between a segment and semi-ellipse. The reinforcement will consist of nine ribs composed of five inch I beams, bent to the radius placed near the intrados at the crown, but passing at varying points in the arch to a position near the extrados at the springing.

The roadway will have a clear width of 16 feet, and the parapet will be formed of concrete pedestals and iron railing.

Ansonia Bridge, Township of Lefroy.—Extensive repairs were made to the Ansonia Bridge, across Thessalon River, in the Township of Lefroy, about seven miles north of the Town of Thessalon. The bridge is 134 feet in length and about 20 feet high above ordinary water level. The centre span is 52 feet, supported on pile piers. The old abutments on the shores were of cribwork and were slipping down the banks. To arrest this movement and to carry the shore ends of the bridge, pile bents were driven on each side of the river. The centre span was rebuilt with new trusses, needle beam and stringers of pine timber. The stringers of the shore spans were strengthened, the old flooring was relaid and covered with new tamarac planking, two inches in thickness. The approaches at both ends were graded and gravelled. The cost of the work, \$488.72, was charged to the appropriation for maintenance of bridges.

Dansey Bridge, Blind River.—This bridge is situated just outside the limits of the corporation of the Town of Blind River and is 450 feet in length, built on piles which are raised by the ice as the water rises in the spring. The recurrence of this action for a number of years makes the floor of the bridge very uneven. All the piles were driven back to their proper position and braced with new sway braces. The floor of the bridge was renewed with three inch planking. The cost of the work, \$368.37, was charged to maintenance account.

West Branch Bridge, Blind River.—Repairs were made to the West Branch bridge at Blind River, at a cost of \$131.58, charged to maintenance

account. The bridge is 370 feet in length, and was recovered with two inch hemlock plank, 9 feet in width.

Tunnel Bridge, Township of Wells.—This bridge, over the Mississagua River, situated at the foot of the rapids known as the Tunnel Rapids, in the Township of Wells, was in a very dangerous condition and a new bridge will be required at a very early date. Only such repairs as were required to make the bridge safe for travel were made. The total cost of the repairs was \$235.32, charged to maintenance account.

BRIDGES, DISTRICT OF NIPISSING.

Vermillion River Bridge, Township of Hammer.—A bridge 94 feet in length, 16 feet in width, and 11 feet 6 inches in height above the ordinary water level, was constructed across the Vermillion River, on the north-east corner of Lot No. 3, Concession 5, Township of Hammer. The bridge consists of a centre span of 30 feet, supported on pile piers, and two shore spans 24 feet in length. The shore abutments are of cribwork filled with stone. The approach at one end is graded for a distance of 200 feet. This work was done by Mr. Louis Brisard of Hammer, under contract for the sum of \$600.00.

Veure River Bridge, Verner.—The bridge across the Veure River in the Village of Verner had been in a decayed condition for some time and required rebuilding. A new steel structure has been erected, 120 feet in length, 14 feet in clear width, and is supported on concrete abutments. The abutments are 20 feet long on the face, 3 feet wide at the top and 5 feet at the base, with wing walls 10 feet in length, 2 feet wide at the top and 4 feet at the base. The height of the abutments is 17 feet. The foundation for the abutments is consolidated by piling, 32 piles under each abutment. The steel superstructure has been erected by Mr. James Vance of New Hamburg, Ont.; the contract price is \$3,056.00. The bridge is made strong enough to carry a concrete floor. The substructure was built by day labor, under the direction of Mr. Alex. Tourongean, Superintendent of Bridges, at a cost of \$2,100.00.

Mattawa Bridge.—The work of completing the approaches to the Mattawa bridge, described in full in last year's report, was carried out during the year 1906. A contract was entered into for the erection of two steel spans, 100 and 112 feet in length respectively, in the month of July, but owing to the great activity in bridge work and other structural steel works, the mills were not able to supply the contractor with materials, and he has been unable to complete his contract. It is expected that early in the year the supply of steel will be obtained and the work completed.

Wolsley River Bridge, Martland Township.—A bridge across the Wolsley River, situated in the 4th Concession, on the town line between the Townships of Cosby and Martland, 200 feet in length and 16 feet in width, was raised 4 feet 6 inches in height to facilitate the running of logs and timber at times of high water.

BRIDGES, DISTRICT OF PARRY SOUND.

Whitestone Bridge, Township of McKenzie.—A new bridge was built over the Whitestone River near Whitestone postoffice, in the Township of McKenzie, to take the place of two old bridges that were situated about a quarter of a mile lower down the stream. The new structure is built upon the road allowance, between the 2nd and 3rd Concessions, and will shorten the distance in the main direction of travel by nearly half a mile. The floor of the bridge is 316 feet in length and 14 feet in width. The west end, two spans 24 feet each and two spans 44 feet each, is built on rock foundation on

cribs filled with stone. The east end, 10 spans 18 feet each, is built on piles. The approach on the east is formed of stone filling 144 feet long, $5\frac{1}{2}$ feet in height at outer end. The flooring is three inches thick, of hemlock, and a substantial railing is provided.

Manitowaba Lake Bridge.—A bridge 158 feet in length was built at the outlet of Manitowaba Lake, near Hurdville P.O., and consists of three king truss spans, 36 feet each, supported on piers formed of double bents, rock bolted, braced and sheeted with planks. One span, 18 feet long at one end and two spans 16 feet each at the other end, are supported on single bents.

Katrine Bridges.—Two bridges were built across two branches of the Maganetawan River at Katrine P.O., in the Township of Armour. The bridge over the east branch consisted of five spans 16 feet each supported on pile bents, and one king truss span 36 feet, supported on piers formed of double rows of piles. The total length of the bridge floor, 128 feet, is laid with three inch plank. The other bridge at the outlet of Dow Lake on the old Muskoka Road, consists of one span 36 feet and six spans 16 feet, supported on tamarac pile piers and bents. The flooring is 144 feet in length of three inch plank. The railing extends along the high approaches, 48 feet beyond the north end of the bridge and 64 feet beyond the south end of the bridge.

South River Bridges.—Two bridges, 40 feet in length each, were built over two channels of the South River, in the Village of South River, during the year 1905, upon a new right of way secured by the municipality of Machar Township, who had undertaken to complete the approaches and roadway. The cost of completing the work was more than the municipality had anticipated, and would have been a burden upon the ratepayers. During the year 1906 forty feet was added to the south end and 50 feet to the north end of the Southerly bridge, and 30 feet to the south end and 20 feet to the north end of the Northerly bridge.

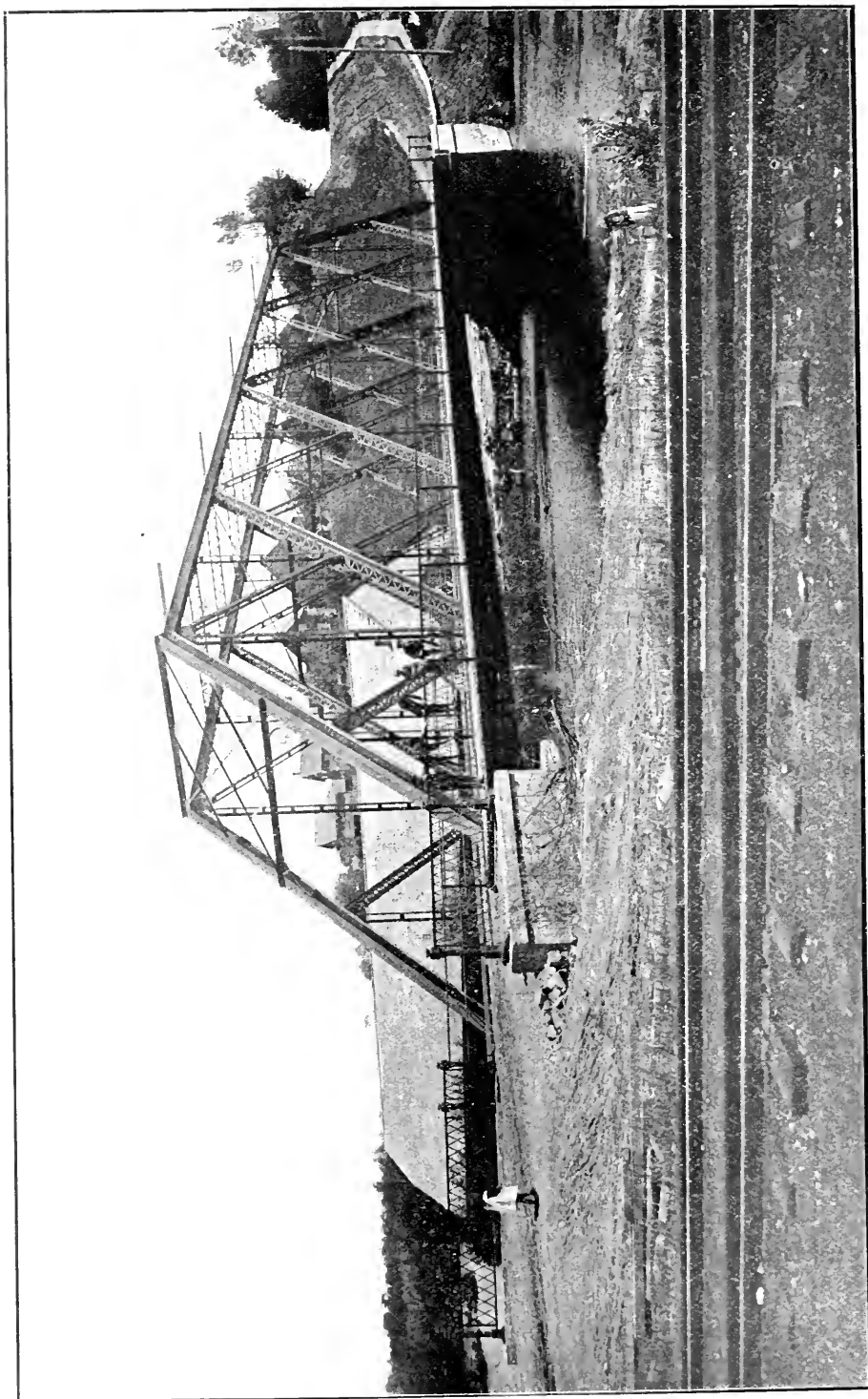
Eagle Lake and Commanda Creek Bridges.—Eagle Lake Bridge, in the Township of Machar, 357 feet in length, was recovered with 3 inch planking and the hand rail repaired, one pier straightened up and filled with stone. The bridge across Commanda Creek at Stewart's Bay, Township of Lount, was also replanked and railing repaired.

Pickrel River Bridge.—A bridge, 56 feet in length, was built across the Pickrel River to replace an old bridge damaged by the driving of logs. The old bridge had an opening 24 feet in width, the new bridge has an opening of 40 feet in clear width. The bridge is built of round timber. The piers, 8 feet wide, 16 feet long and 9 feet high, are built of pine and spruce. The covering is round cedar, flatted on top for a space of 8 feet.

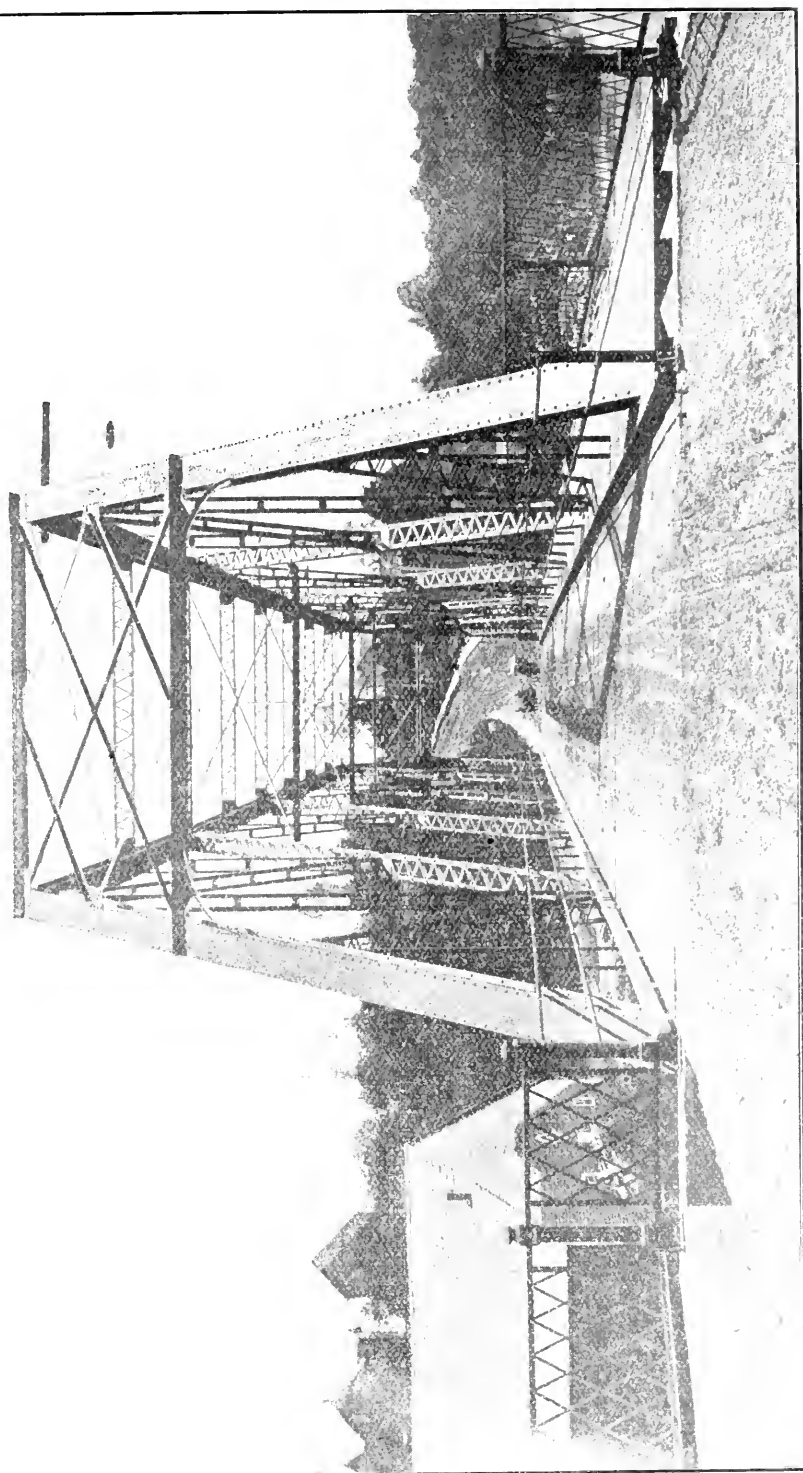
Kearney Bridge.—Slight repairs were made to the bridge over the Maganetawan River, in the Village of Kearney, which was in a very decayed condition and unsafe for heavy traffic. Supports were put under the needle beams and some new joists supplied. An appropriation will be required for the renewal of this bridge in the estimates for 1907.

BRIDGES, DISTRICT OF MUSKOKA.

Bracebridge Bridge.—The bridge over the north branch of the Muskoka River, on Thomas Street, in the Town of Bracebridge, described in the report of 1905, was fully completed and opened for traffic in the month of March, 1906. It is a heavy steel structure, 190 feet in length in one span. The roadway has a clear width of 18 feet; a footwalk 6 feet in width is provided on the south side of the bridge.



Bridge across Muskoka River, Thomas Street, Bracebridge.



Bridge across Muskoka River, Thomas Street, Bracebridge.

Bala Bridge.—A steel bridge, on concrete abutments, was erected over the main channel of the outlet of Bala Bay, in the Village of Bala, the old timber bridge having been in a worn out and decayed condition for some time. The bridge consists of one central span 75 feet in length, one span 45 feet in length, and one span 22 feet in length. The steel superstructure was furnished and erected by the Ontario Bridge Company, of 34 Victoria Street, Toronto, who carried out their contract very promptly and in a satisfactory manner. The substructure consists of two concrete piers and two abutments on solid rock foundation. The approaches were filled in for a distance of 20 feet at the north end and 30 feet at the south end with stone and gravel filling.

Hoodstown Road Bridge, Chaffey Township.—A grant of \$1,200.00 was paid to the Municipality of the Township of Chaffey, in the year 1905, to assist in the erection of a bridge over the Big East River, on the Hoodstown Road. An additional grant of \$800.00 was paid in the year 1906, the bridge and approaches having been completed at a total cost of \$3,450.78. The bridge is of steel, 64 feet in length, supported on stone piers, and the approaches are 46 feet in length at each end.

Beaver Creek Bridge and Approaches.—A new bridge was built across Beaver Creek on lot No. 2, concession 2, Township of Monck. The new bridge was raised 5 feet higher than the old, and supported on two stone abutments. A high clay hill was cut down to the extent of 8 feet, and the earth used in raising the approaches to the bridge. The work has made a great improvement in the alignment and grade of the road, over which there is heavy traffic, to the Town of Bracebridge.

Axe Creek Bridge, Township of Stisted.—This bridge was a long, low structure over a creek and marsh, which was flooded by a mill dam. Two stone abutments were built, and a good bridge, with 27 feet span, erected. A filling of stone and clay, with gravel on top, 163 feet in length, replaced the old wooden structure. A good, substantial railing, 200 feet in length, was placed on each side of the bridge and approaches. The cost of the work was \$353.39.

Housey's Rapids Bridge, Township of Ryde.—This bridge 192 feet long, built fourteen years ago, collapsed in the month of June. A temporary crossing is provided for use until a new structure can be erected. An appropriation for rebuilding the bridge will be required for 1907.

Outlet Creek Bridge, Township of McLean.—This bridge over a stream known as Outlet Creek, on the Bracebridge and Baysville Road, 70 feet in length, was rebuilt on bents and posts twenty feet in height above the water. The banks are high and rocky. The expenditure amounted to \$390.09.

Kahshee Bridge, Township of Morrison.—This bridge, situated on the Muskoka Road, halfway between Severn Bridge and Gravenhurst, was rebuilt. The old bridge had one span, 55 feet in length. In rebuilding the length was reduced by 8 feet. The abutments are built of dry stone, and were raised 3 ft. 6 in. higher than the old ones, which reduced the grade on the steep hills on each side of the bridge. This improvement of the grades is much appreciated. The total cost of the work was \$321.52.

Messiers Creek bridge.—Repairs were made to the bridge over Messiers Creek, on lot No. 32, concession 7, Township of Baxter, which was in a very dangerous condition. The bridge is 70 feet in length. The materials were provided by the Department, and the interested settlers performed the labor free of charge. The expenditure amounted to \$57.20, and was charged to maintenance account.

TEMISKAMING DISTRICT BRIDGES.

North Road bridge, Dymond Township.—On lots No. 8 and 9, concession 5, Township of Dymond, a very deep gully exists at the point where the North Road crosses the 5th concession. When the road was first made a detour from its general course, between lots 8 and 9, was made down the sides of the ravine, and the stream was crossed by a short, low bridge.

To avoid the descent into the valley and ascent up the steep grade in both directions of travel, a new bridge was built on the line of road at a higher level. The total length of bridge is now 175 feet, about 32 feet in height above the bottom of the ravine. It consists of 11 trestle bents 17 feet 6 inches between centres; the floor of the bridge is 16 feet clear width. The approaches were graded to a distance of 425 feet at the southerly end and 300 feet at the northerly end. The work was carried out in a very satisfactory manner, by Mr. J. H. Kerr, contractor for the erection of the bridge. The timber was supplied by Mr. David Irwin.

Wright's Creek bridge.—The bridge over Wright's Creek, on lot No. 9, concession 2, Township of Casey, which had been carried away by the spring freshet in 1905, was rebuilt under contract, by Mr. George Roberts & Sons, Contractors of Judge P.O. The length of the bridge floor is 104 feet, the main span is 70 feet in length and 24 feet in height. The work was inspected by Mr. W. E. Kerr, inspector of colonization roads, who reported that the bridge had been completed in a satisfactory manner.

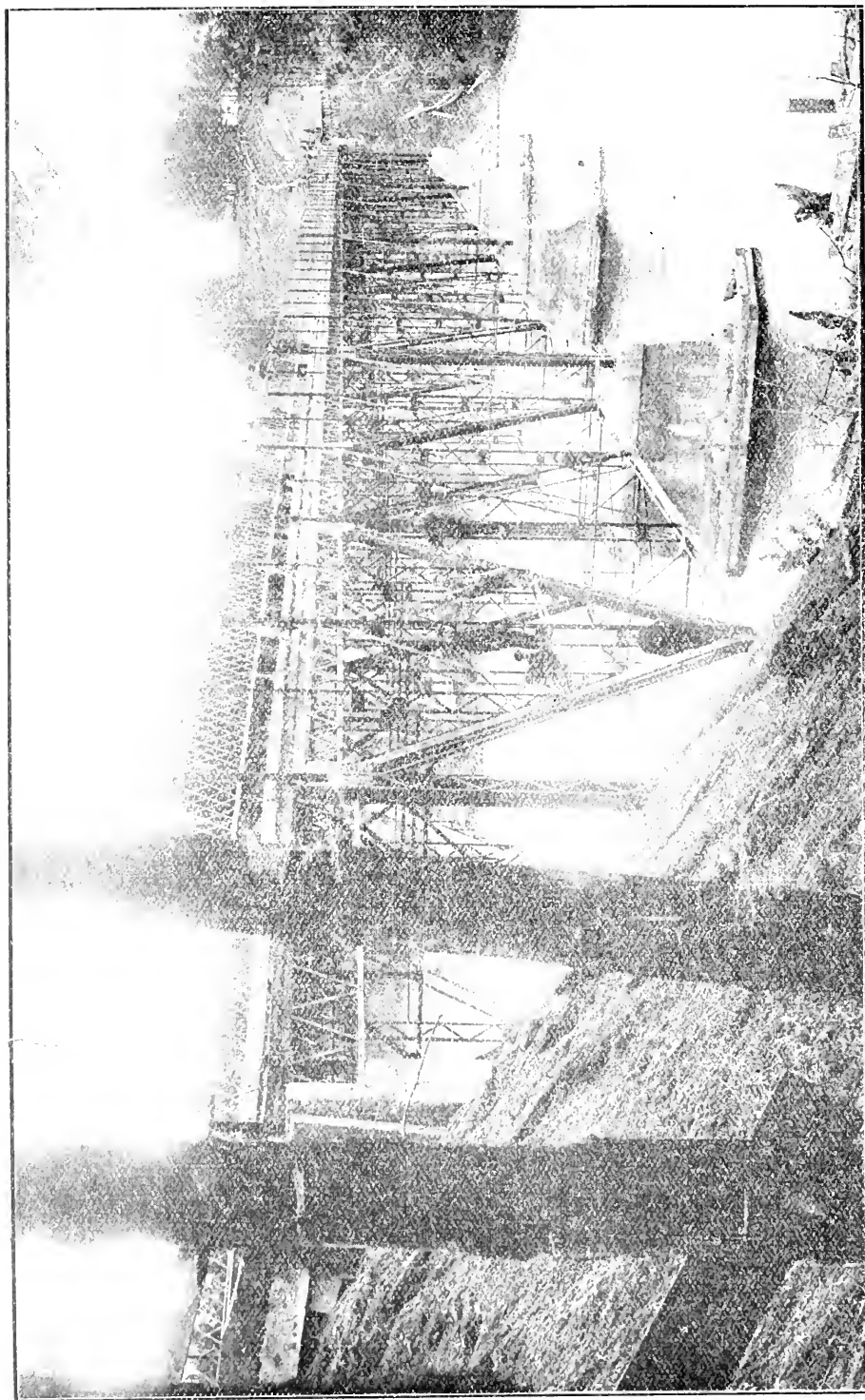
La Blanche River bridge, Tomstown.—An appropriation of \$4,000.00 was made for the erection of a bridge over La Blanche River, at the last session of the Legislature. Plans and specifications were prepared and tenders asked for by advertisement in the local papers. As the tenders were considered too high for the work, it was decided to purchase the material and erect the bridge by day labor. The material is now being delivered, and the work will be proceeded with during the winter. The bridge will consist of three spans of 60 feet each, and two spans of 37 feet each, the total length of the flooring, 314 feet. The height of the bridge will be 36 feet above low water level.

L'AMABLE BRIDGE, TOWNSHIP OF DUNGANNON.

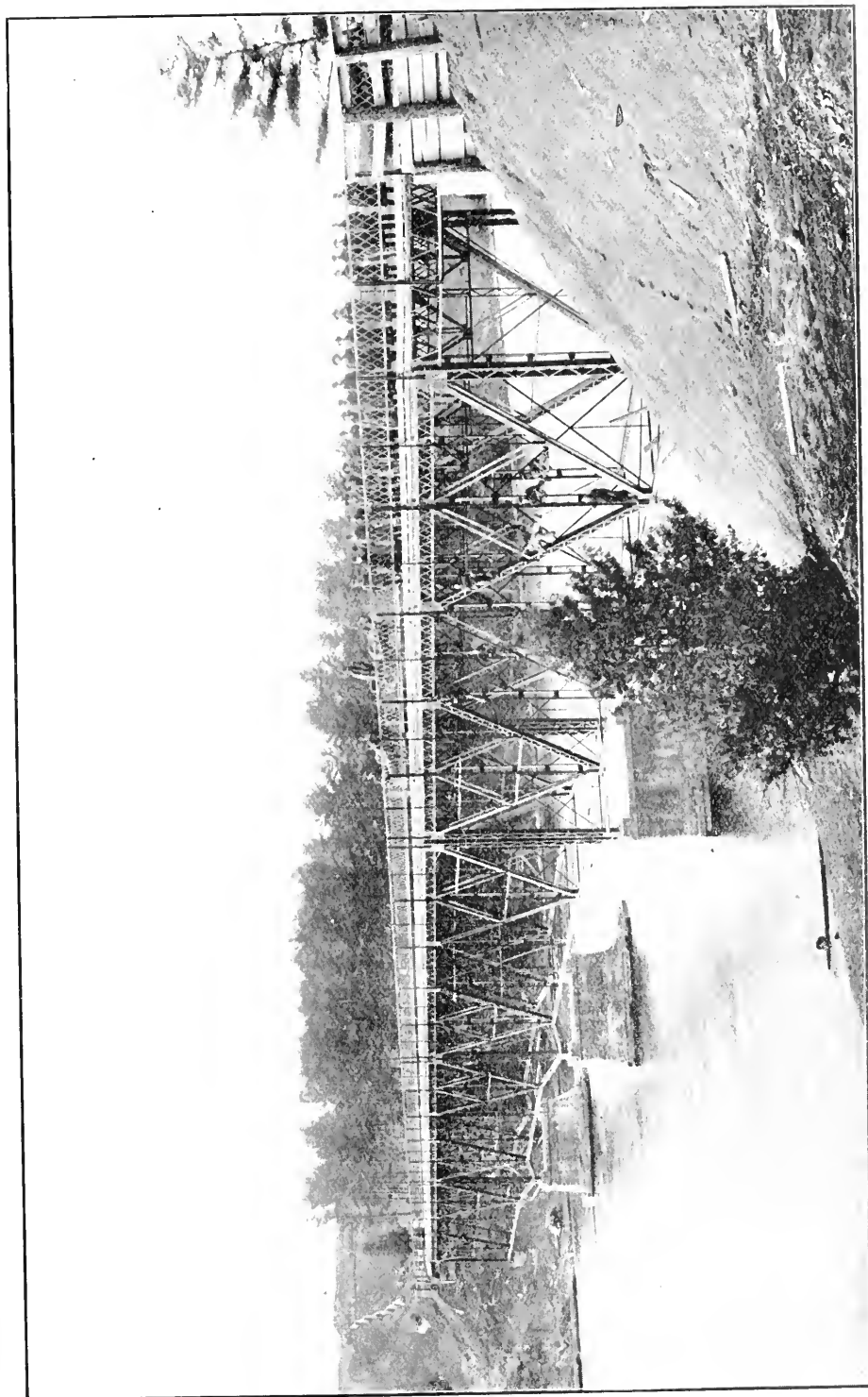
A permanent bridge with concrete foundation was constructed on the town line between Dungannon and Faraday, at a cost of \$1,738.73. The County of Hastings furnished \$217.30, the Township of Faraday, \$100.00, and the Township of Dungannon, \$150.00, the balance being paid by the Province. The bridge was shortened materially by filling in the approaches with earth and gravel.

BURNT RIVER BRIDGE, TOWNSHIP OF SNOWDON.

A permanent steel bridge, known as Simmons Bridge, was built over Burnt River, near the Village of Irondale, in the Township of Snowdon. The bridge consists of one span 59 feet 0 inches in length, and 14 feet in width, supported on concrete abutments, the foundation being consolidated by driving piles at about 2 feet 8 inches centre. The approaches were filled with earth and gravelled, and rip-rapped on the up-stream side. The steel superstructure was supplied and erected by Mr. James A. Vance, of New Hamburg, Ontario, at a cost of \$670.00. The total cost of the bridge was \$1,977.18.



Madawaska River Bridge : near Amprior.



Madawaska River Bridge ; near Arnprior.

MADAWASKA BRIDGE, TOWNSHIP OF McNABB.

A grant of \$3,000.00 was made at the last session of the Legislature towards the erection of a bridge over the Madawaska River, near the Town of Arnprior, in the Township of McNabb. There are four main spans of 105 feet 0 inches centre to centre, and two approach spans 28 feet 0 inches each. The roadway is 16 feet 6 inches clear, with reinforced concrete floor. The substructure consists of three main concrete piers carried down to the rock with two auxiliary piers, and two cross walls in the bank. The contract price of the bridge was \$22,022.00. Upon the report of the engineer in charge of the work, that the bridge had been satisfactorily completed, the amount of the grant, \$3,000.00 was paid to the municipality.

BLACK DUCK BRIDGE, TOWNSHIP OF BUCHANAN.

This bridge is located over Black Duck Creek, on lot 7, in the 9th concession, and lot 7 in the 8th concession. The structure is 20 feet long, and 12 feet high from the creek bed. It is constructed of cedar on stone foundation. The approaches on each side were cut down and the road straightened, making a good road and crossing.

INDIAN RIVER BRIDGE, TOWNSHIP OF ALICE.

A new bridge was built across the Indian River, on lot No. 10, concession No. 10, Township of Alice. There is one main Queen truss span, 35 feet, one span 28 feet, and one approach span, 13 feet, supported on timber cribs 8 feet in width. The floor of the bridge is 12 feet in height above the bed of the stream; the total length of floor is 105 feet. The material used is cedar, except for flooring, which is 3 inches hemlock plank. The approaches were filled with earth and a substantial rail provided.

CANARD RIVER BRIDGE, TOWNSHIP OF ANDERDON.

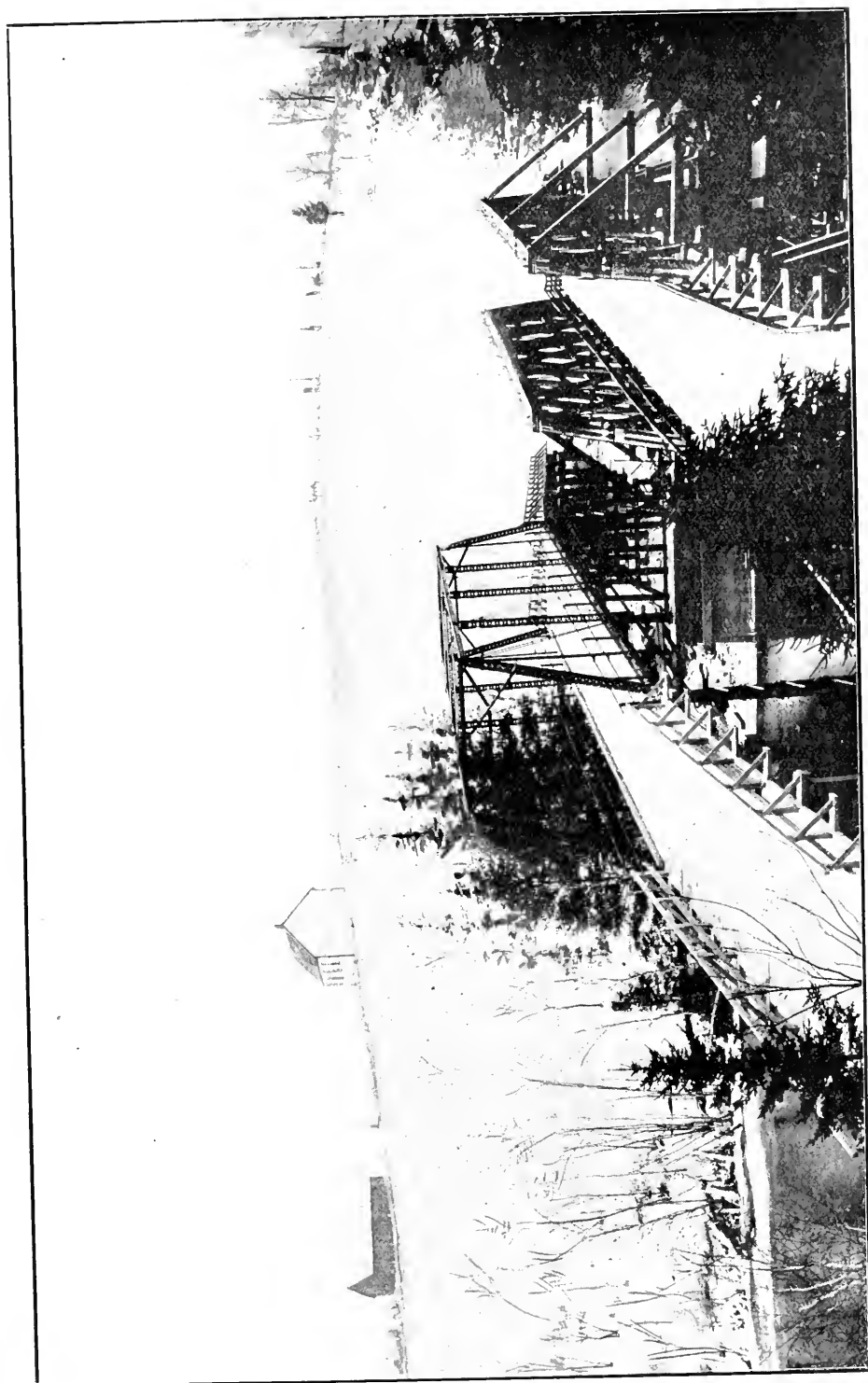
A grant of \$1,000.00 was made at the last session of the Legislature to aid in the erection of a bridge over Canard River, in the Township of Anderdon. The bridge will consist of a steel superstructure in one span 141 feet 11 inches in length, and 16 feet in clear width, supported on two concrete abutments of 19 feet 3 inches face, with wing walls of 19 feet 3 inches face. The height of the abutments is 8 feet, width at top 3 feet 0 inches, and at the bottom 3 feet 6 inches.

The contract price for the substructure is \$2,880.00. The contractor is Mr. Remi Laframboise. The contract price for the steel superstructure is \$3,690.00.

As the work of construction was well advanced towards the close of the year, the amount of the grant, \$1,000.00, was paid to the Treasurer of the Township of Anderdon.

MUSKOKA LAKES' WORKS.

The capital expenditure on the Muskoka lakes works for the year 1906, consisted of an extension of the wharf for the accommodation of launches and small boats, and the rebuilding of the bridge over the Indian River at Port Carling.



High Bridge above Mary's and Fairy Lakes Lock, near Huntsville.

In making the extension to the wharf, the boat houses that formerly stood on the north side of the lock were removed to a position on the south side, and the space floored with 3 inch planking, making the wharf 46 feet in width for a length of 104 feet, giving ample space where before the wharf was narrow and contracted. In addition to the increased width, a wharf was constructed along the shore for a length of 250 feet, and 20 feet in width, for the accommodation of launches and small boats.

The bridge over the Indian River, which had become in a decayed and unsafe condition, was rebuilt with new pine timber throughout. The bridge has a length of 65 feet, and a width of 12 feet. The abutments were repaired where necessary.

MARYS AND FAIRY LAKES WORKS.

The capital expenditure on the Marys and Fairy lakes Works in 1906, consisted of the completion of the cribbing above the locks, begun in August, 1905. This work was finished in April, 1906, before the opening of navigation. The cribbing was renewed for a length of 150 feet on the west side of the canal, 8 feet wide and 9 feet high, and for a length of 40 feet on the east side, 6 feet wide and 9 feet high.

High Bridge, above Marys and Fairy Lakes Lock.—A contract for steel superstructure for the high bridge over the Muskoka River, above the lock, was let, and the materials were delivered, and work of erection begun at the close of the year. The bridge has a length of 106 feet, and a width of 14 feet, and is supported on steel pedestals, 15 feet in height, resting upon concrete piers. The piers were built in the year 1905, but were raised 4 feet higher in 1906 to give sufficient clear height to allow the new steamer Algonquin, to pass under. A clear headway of 27 feet above the summer level is now provided.

The bridge is a pin connected Pratt truss. The contract price is \$2,875.00. The approaches are wood trestles, 96 feet in length on the west side, and 50 feet on the east side.

MAGNETAWAN RIVER WORKS.

The capital expenditure on the Magnetawan River works in 1906, consisted of dredging an entrance into Neighick or Beaver Lake, from Ahmic Lake. A channel 30 feet in width for a length of about 650 feet was dredged to a depth of 7 feet. This channel will enable navigation to reach many settlers on the shores of the lake, and through it large quantities of tan bark, timber and agricultural produce will reach a market.

LA VASE CREEK, TOWNSHIP OF FERRIS.

Improvement of La Vase Creek, in the 7th and 8th concessions of the Township of Ferris, for the drainage of swamp lands, was carried out at a cost of \$150.00. A rocky barrier on lot 18, concession 8, was blasted for a length of 50 feet, 8 feet wide and one foot deep. The old creek was cleared out for about one quarter of a mile, and a new channel dug 528 feet long, 12 feet wide, and 3½ feet deep.

Improvements were also made, on lot No. 13, concession 9, and lot No. 17, concession 10, where channels were blasted through rocky obstructions, improving the drainage of large areas, and reclaiming about 1,000 acres of swamp lands. The cost of the work was \$350.00.

GRAHAM CREEK, TOWNSHIP OF CHISHOLM.

A channel was blasted in solid rock through the rapids in Graham's Creek, on lot 5, concession 10, Township of Chisholm, at a cost of \$150.00. This work was carried out to improve the drainage of the lands and roads in the vicinity, and relieve them from flooding.

BOON CREEK, TOWNSHIP OF PAPINEAU.

A channel, 75 feet in length, 20 feet in width, and $2\frac{1}{2}$ feet in depth, was cut through a solid rock obstruction in Boon Creek, on lot No. 14, concession 11, Township of Papineau, at a cost of \$150.00. This work will greatly improve the drainage of about 1,000 acres, from lots 13 to 15 in the 10th concession, and from lots 10 to 16 in the 11th concession.

NORTH RIVER, TOWNSHIP OF ORILLIA.

The work of improvement on the North River, in the Township of Orillia, was continued from October 1st to November 7th. A channel 384 feet in length was cut through rock obstructions on lot No. 17, concession 6, at a cost of \$980.00. It is expected that the removal of this obstruction will benefit a large area of good agricultural lands, and improve the condition of the roads.

MAINTENANCE LOCKS, DAMS & BRIDGES.

The works attended to, chargeable to the appropriation of locks, dams and bridges, in addition to those already mentioned, were as follows:

Swamp and Bass Lake Dam.—Early in the season, before the transfer of the Trent Valley works to the Department of Railways and Canals, Canada, slight repairs were made to these dams: new windlasses and six new stop logs were provided.

Keeling's Bridge, Township of Dunnett.—Repairs were made to a bridge across the Veuve River, on lot No. 4, concession 6, Township of Dunnett.

Minden Bridge.—Temporary repairs were made to Minden Bridge, at a cost of \$40.00. The superstructure is in such bad condition that it must be rebuilt, or a new bridge provided at an early date.

Bushkong Bridge.—The Bushkong Bridge was entirely refloored, and the stringers strengthened.

Marys and Fairy Lakes Lock.—A new set of stop logs were supplied at the head of the canal. The swing bridge over the canal was repaired, some new floor joists were put in and planked over with 2 inch planks. Twelve new stop logs were supplied in the main dam across the river. The high bridge, above the lock, was supported temporarily until the new bridge is completed, by a bent from the bed of the river to the chords of the truss.

Port Sydney Dam.—Six new stop logs were supplied to the Port Sydney dam, which controls the level of Marys Lake.

Peninsula Canal.—The bridge across the Peninsula Canal was raised 5 feet higher to allow the Steamer Algonquin to pass under. Sunken logs which interfered with navigation were cleaned out of the canal.

Dorset Bridge.—Repairs were made to the Dorset bridge; one new needle beam was put in, and several piles to support chords of approaches. The bridge was raised three feet higher, and painted.

Huntsville Swing Bridge.—The steel bridge, in the Town of Huntsville, was repainted.

Ryerson Swing Bridge.—The swing bridge across the Magnetawan River, about 2 miles west of Burk's Falls was repainted.

Magnetawan Lock.—The lock gates at Magnetawan lock were repaired early in the season before the opening of navigation. New balance beams were supplied for the lock gates. The swing bridge, in the Village of Magnetawan, below the locks, was repaired and repainted.

Port Carling Lock.—The bridge over the Indian River at Port Carling, was renewed and an extension of the wharf made, already mentioned under capital expenditure on Muskoka Lakes Works. Repairs were made to the sides of the lock, and the wharves. Materials are on the ground to complete repairs before the opening of navigation next spring.

Port Sandfield.—Some repairs were made to the planking of the wharf, and the cribwork was filled with stone and gravel. Material is on the ground to complete the repairs to the swing bridge and cribbing, before the opening of navigation in the spring.

Bala dams and bridges.—The bridge over the main channel of the outlet of Muskoka Lake, was rebuilt in steel on concrete foundation, as described before. The wooden bridge over the southerly channel was repaired and repainted. Four new stop logs were supplied and slight repairs made to the dams.

Office and Store Room, Lindsay.—The superintendent's office and store room at Lindsay, was raised, and placed upon a new foundation. The building was repainted.

Equipment.—New engines and boiler were installed in the dredge at Magnetawan early in the season. When the dredging operations at Neighick Lake were completed, the machinery was removed and installed in the dredge at Port Carling, in readiness for operation on the Muskoka waters in the season of 1907.

A stone crusher was purchased from the Town of Mattawa, and employed in the work on the concrete piers for the Spanish River bridge at Webbwood, and has proved a satisfactory machine.

Indian Point bridge, Manitoulin Island.—Slight repairs were made to the approaches and bridge across Wolsley Lake, at Indian Point, Manitoulin Island

Keewatin Dam.—The waters of the Lake of the Woods were regulated by the caretaker of the dam at Keewatin, by the removal and replacing of stop logs as required. Gauges were placed on Rainy River at Emo and Fort Frances, and daily readings taken and forwarded to the caretaker at Keewatin for his guidance in operating the stop logs.

McLean's Bridge, Township of Carlow.—Extensive repairs, costing \$439.82, were made to this bridge, which is 65 feet in length. The bridge has been rebuilt with good, sound cedar, with one Queen truss span 42 feet in length. The covering is of cedar plank 6 inches thick. The whole of the timber has been covered with coal tar. The approaches were filled with stone, and the outside of the piers have been protected with stone filling.

May's Bridge, Township of Carlow.—Extensive repairs were also made to May's Bridge, over York River, lot No. 20, concession 10, Township of Carlow, at a cost of \$455.47.

Log slide, Wahnapiatae Lake.—A caretaker was placed in charge of the log-slide between lakes Metagamasing and Wahnapiatae, while the logs were passing through in the months of May and June. The following quantities of timber passed through the slide, beginning May 3rd, and ending June 20th, 1906.

Victoria Harbor Lumber Company, 313,021 saw logs, equal to 13,293,767 feet board measure, and 3,270 pieces of boom timber, equal to 539,461 feet board measure.

The C. Beck Manufacturing Company, 160,092 saw logs, equal to 6,361,094 feet board measure, and 3,361 pieces boom timber, equal to 575,658 feet board measure.

LOCKMASTERS' RETURNS.

The following are the lockmasters' returns of lockages made during the year 1906:

Port Carling Lock.—Four thousand five hundred and fifty-six steamers, 1,032 small boats, 732 scows, and 165 rafts or cribs of timber.

Marys and Fairys Lakes Lock.—Seven hundred and six steamers, 109 small boats, 216 scows, and 214 rafts or cribs of timber.

Magnetawan Lock.—Nine hundred and fifty-three steamers, 21 small boats, 377 scows, and 13 rafts or cribs of timber.

WORKS ON TRENT VALLEY TRANSFERRED TO DOMINION OF CANADA

After several interviews between representatives of the Department of Railways and Canals, Canada, and representatives of the Ontario Government, a formal application was made on January 6th, 1904, for the transfer to the Government of Canada, of the several drains owned by the Ontario Government on the head waters of the Trent Canal.

A scheme for an extensive reservoir system was contemplated by the Department of Railways and Canals, to ensure sufficient water supply at all seasons for the purposes of navigation on the Trent Valley Canal. Negotiations were conducted between the officers of the Department of Railways and Canals and the officers of the Department of Public Works, Ontario, when the terms of the proposed transfer were thoroughly gone into and the views of all parties interested were obtained and considered.

An agreement upon the terms of the transfer was finally reached between the Governments of the Dominion of Canada and the Province of Ontario, and an Order-in-Council was approved by His Honor, The Lieutenant-Governor, on the 22nd of July, 1905, transferring the works to the Dominion Government. A confirming order of the Privy Council was approved by His Excellency, the Governor-General, on the 16th of February, 1906, assuming their control.

The following are the terms upon which the waters and works were transferred to the Department of Railways and Canals, Canada:

(1) That all the locks, dams, rights in waters and flooded lands and other works as shown by the hereto attached list and plan be transferred to the Dominion Government, represented by the Department of Railways and Canals, free of all cost.

(2) That the Dominion Government shall assume, operate and keep in good repair and condition for all time, the lock and three swing bridges at Lindsay, the lock at Balsam Lake and the lock and swing bridge Young's Point, together with all minor works in connection with the maintenance and

operation of the locks and swing bridges at Lindsay, Balsam Lake and Young's Point, relieving the Province from all expense and responsibility in connection therewith.

(3) That the right of reservoir construction by the Dominion Government shall be exercisable on and limited to the following: Gull River, Burnt River, Squaw River, Nogie's Creek, Deer Bay, Mississauga Creek, Eels Creek, and Jack's Creek, and the drainage areas of such rivers and creeks.

(4) That the following dams shall be maintained for all time by the Dominion Government, subject as hereinafter provided:

ON GULL RIVER WATERS.

Balsam Lake	Keneesis Lake
Gull Lake	Redstone Lake
Horseshoe Lake	Eagle and Moose Lake
Hawk Lake	Oblong and Haliburton Lake
Paint Lake	Percy Lake
Hall's Lake	

ON BURNT RIVER WATERS.

Kocklong Lake	Otter Lake
Drag Lake	Grace Lake
Loon Lake	Farquar Lake
Big Bear Lake	

ON NOGIE'S CREEK.

Swamp Lake

ON MISSISSAUGA CREEK.

Gull Lake	Eagle Lake
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(5) That with regard to the smaller or other dams not being actually required by the Department for the proposed reservoir system, but now utilized for the flotation of logs, the Dominion Government shall not be required to maintain these dams except only for as long as they are of material use for the purpose of log flotation or log navigation.

(6) That the Dominion will pay to the Province at the rate of fifty cents per acre for any unpatented Provincial lands flooded through the construction of the proposed reservoirs, that compensation for the flooding of patented lands and for damage done to timber on patented lands or on unpatented lands under license to lumbermen and others, be a matter of agreement between the Dominion Government and the owners or licensees of such lands or timber, and in the event of failure of such owners or licensees to agree with the Dominion Government regarding such compensation, then the matter shall be left to the determination of the Exchequer Court of Canada in the usual manner.

(7) That the Minister of Railways and Canals shall have the right at any time to rebuild and maintain dams at present existing, or at any time to construct and maintain dams in lieu thereof at other than the present sites for the same; to increase or decrease heights of all or any such dams; to determine the size and capacity of the openings therein, and the means of controlling the water supply thereat; and to construct or reconstruct,

operate, and maintain the works necessary to the same: also from time to time to build and maintain new dams wherever he may deem advisable for the proper carrying out of proposed reservoir system, and to maintain and operate the same.

(8) That all mines and minerals in unpatented Provincial lands taken over and flooded in the course of construction of reservoirs, be reserved to the Province: and that all mines and minerals on patented lands are still to remain the property of the patentee until proper compensation be granted therefor, and all reasonable provision essential to the operation and working of the same be allowed, subject to the requirements of navigation of the Trent Canal.

(9) That the Dominion Government guarantees to the owners and lessees of timber lands tributary to the streams and lakes affected by this order, and to lumbermen now or hereafter operating on such streams and lakes, all rights they at present enjoy or are entitled to, by any law or statute now in force with regard to the use and enjoyment of rivers and streams, and also guarantee to the owners and lessees from time to time of any water power derived from such lakes and streams all rights they at present enjoy or are entitled to by virtue of any law or statute now in force, and in the event of such rights being injuriously affected by the action of the Dominion Government, their successors, assigns, employees or representatives in connection with such waters and streams, then the owners and lessees of such timber lands, timber and water power, shall have the right to submit their claims to the Exchequer Court of Canada for adjudication and compensation in the usual manner.

SCHEDULE OF WORKS TRANSFERRED TO THE DEPARTMENT OF RAILWAYS AND CANALS, CANADA.

NAME OF WORK.	LOCATION.
Lock at Young's Point. Including swing bridge and all Ontario Government works at Young's Point.	Young's Point, County of Peterboro', on the line of the Trent Valley Canal.
Lock at Balsam River.	Balsam River, between Balsam and Cameron Lakes, on the line of the Trent Valley Canal.
Mississigua Creek.	Joins the line of the Trent Valley Canal in the 8th Concession of Harvey.
(1) Scott's Mill Dam.	Lot No. 15, Con. 8, Harvey.
(2) Mississigua or Gull Lake Dam.	Lot No. 31, Con. 4, Harvey.
(3) Eagle Lake Dam.	Lot No. 3, Con. 2, Anstruther.
(4) Deer Lake Dam.	Lot No. 15, Con. 6, Anstruther.
(5) Bottle Lake Dam.	Not No. 3, Con. 6, Cavendish.
Squaw River.	Joins line of Trent Valley Canal in Buckhorn Lake, Con. 14, Harvey.
(1) Dam No. 1.	Lot No. 17, Con. 12, Harvey.
(2) Dam No. 2 or Big Dam.	Lot No. 18, Con. 12, Harvey.
(3) Dam No. 3.	300 feet southerly from Big Dam.
(4) Dam No. 4.	Lot No. 31, Con. 11, Harvey.
(5) Dam No. 5.	Lot No. 30, Town Line, Galway and Harvey.
(6) Dam No. 6.	Lot No. 31, Con. 10, Harvey.
Nogies Creek.	Joins line of Trent Valley Canal in Pidgeon Lake, Con. 16, Harvey.
(1) Dam No. 1, Bass Lake.	Lot No. 10, Con. 2, Galway.
(2) Dam No. 2, Bass Lake Rapids.	Lot No. 10, Con. 5, Galway.
(3) Dam No. 3, Townsend Dam.	Lot No. 18, Con. 7, Galway.
(4) Dam No. 4, Bib Marsh.	
(5) Dam No. 5, Swap Lake.	
Burnt River Works.	Joins Trent Valley Canal at head of Cameron Lake.
(1) Piers at mouth of river.	In Cameron's Lake.
(2) Dam at Kinmount.	Township Sommerville, Main Stream.
(3) Dam at Kushog.	Lot No. 15, Con. 14, Snowden.
(4) Dam at Cocklong Lake.	Lot No. 9, Con. 15, Glamorgan.
(5) Dam at Drag or Mud Lake.	Lot No. 23, Con. 8, Dysart.
(6) Dam at Loon Lake.	Lot No. 1, Con. 2, Dudley.
(7) Dam at Devil's Lake.	Lot No. 1, Con. 5, Glamorgan.
(8) Pier, Devil's Gap.	Lot No. 9, Con. 6, Glamorgan.
(9) Dam at White Lake.	Lot No. 2, Con. 1, Glamorgan.
(10) Dam at Contains Lake.	Lot No. 18, Con. 5, Glamorgan.
(11) Dam at Pine Lake.	Village of Gooderham.
(12) Dam at Big Bear Lake.	Lot No. 30, Con. 9, Glamorgan.
(13) Dam at Little Bear Lake.	Town Line, Glamorgan and Monmouth.
(14) Dam at Stormy Lake.	Lot No. 30, Con. 13, Glamorgan.
(15) Dam at Otter Lake.	Lot No. 24, Con. 14, Monmouth.
(16) Dam at Otter Creek Marsh.	Monmouth.
(17) Dam at Grace Lake.	Lot No. 35, Con. 16, Monmouth.
(18) Dam at Farquhar Lake.	Lot No. 5, Con. 1, Harcourt.
(19) Dam at High Falls.	Lot No. 6, Con. 9, Monmouth.
(20) Dam at Copes Falls.	Lot No. 26, Con. 9, Monmouth.

NAME OF WORK.

LOCATION.

Gull River Works.

Gull River joins Trent Valley Canal at Cobocouk, head of Balsam Lake.

- (1) Dam at Norland.
- (2) Dam at Elliott's Falls.
- (3) Moore's Falls or Gull Lake.
- (4) Dam, Little Bob Lake.
- (5) Dam, Big Bob Lake.
- (6) Dam Workman's Mill.
- (7) Dam Horseshoe Lake.
- (8) Dam, Hall's Lake.
- (9) Dam, Hawk Lake.
- (10) Dam at Crab Lake.
- (11) Dam at Paint Lake.
- (12) Dam at Keneese Lake.
- (13) Dam at Redstone Lake.
- (14) Dam at Eagle and Moose Lakes.
- (15) Dam at Oblong Lake.
- (16) Dam at Percy Lake.

Norland P. O., Laxton and Summerville.

Lot No. 22, Con. 7, Lutterworth.
 Lot No. 13, Con. 11, Lutterworth.
 Lot No. 12, Con. 14, Lutterworth.
 Lot No. 2, Con. 3, Minden.
 Lot No. 10, Con. 5, Minden.
 Lot No. 11, Con. 6, Stanhope.
 Lot No. 15, Con. 12, Stanhope.
 Lot No. 21, Con. 3, Sherborne.
 Lot No. 27, Con. 3, Sherborne.
 Lot No. 3, Con. 2, Havelock.
 Lot No. 21, Con. 8, Guilford.
 Lot No. 30, Con. 8, Guilford.
 Lot No. 25, Con. 3, Guilford.
 Lot No. 3, Con. 5, Harburn.
 Lot No. 8, Con. 6, Harburn.
 Lot No. 20, Con. 8, Harburn.

Bear Creek Works.

Trubutary to Burnt River, Township of Glamorgan.

- (1) Dam at Big Marsh.
- (2) Slide No. 1.
- (3) Slide No. 2.
- (4) Gance Pier.

Lot No. 24, Con. 8, Glamorgan.
 Below Big Marsh at outlet of Creek into Pine Lake.
 At "The Kettles" or High Falls.
 Near Pine Lake.

Stoney Creek Improvement.

Trubutary to Mississigua Creek.

- (1) Dam No. 1.
- (2) Dam No. 2.
- (3) Dam No. 3.
- (4) Dam No. 4.
- (5) Dam No. 5.
- (6) Dam No. 6.

Lot No. 28, Con. 8, Cavendish.
 Lot No. 28, Con. 9, Cavendish.
 Lot No. 29, Con. 10, Cavendish.
 Lot No. 29, Con. 10, Cavendish.
 Lot No. 1, Con. 11, Anstruther.
 Lot No. 2, between Cons. 10 and 11, Anstruther.

Seugog River Works.

Lindsay Lock, including three swing bridges, viz.: On Lindsay Street, Wellington Street, and bridge south of Lindsay.

In the Town of Lindsay, on the Seugog River, which joins the line of the Trent Valley Canal in Sturgeon Lake. This lock extends navigation to Whitby Ferry on Seugog Lake.

EXTENSION OF RAILWAYS.

Railway building in the Province has not been so active for many years as during the season of 1906.

Grand Trunk Railway.—The G.T.R. have continued the work of improvement of grades and alignment during the year 1906. At a point a short distance west of the City of London some very heavy work is being carried out in the improvement of grades.

The only piece of new railway constructed was between Lindsay and a point west thereof, a diversion, a distance of 3.51 miles.

Canadian Pacific Railway.—The C.P.R. has been working vigorously upon their Kleinburg-Sudbury branch, a distance of 227 miles, and have

opened for traffic the southerly 51.7 miles from Bolton Junction to Craighurst. Track has been laid from Craighurst to Bala, a distance of 41.3 miles, also on the north end of the line from Romford for a distance of 24 miles south thereof. Grading is completed on the south end from Craighurst to Parry Sound, a distance of 75.3 miles, and on the north end from Romford to Byng Inlet, a distance of 59 miles. The grading between Parry Sound and Byng Inlet, a distance of 40 miles, is now in progress and is about 60 per cent. completed.

Work has been progressing on the Guelph and Goderich line during the year, a distance of 88 miles. A distance of 31.96 miles from Guelph to Milverton has been completed and put into operation.

On the Walkerton-Lucknow Railway, from Proton on the Owen Sound branch to Walkerton, a distance of 37.5 miles, grading is in progress; about 40 per cent. has been completed, but no track has as yet been laid.

Of the double tracking between Fort William and Winnipeg, about 72.5 miles have been completed in Ontario, viz.: Fort William to Kakabeka, 19 miles; Dexter to Linko, 5.5 miles; Falcon to Ignace, 6 miles; Ignace to Raleigh, 15 miles, and Dryden to Vermillion, 27 miles. There is now under construction 254.2 miles, as follows:—

Kakabeka to Dexter, 35 miles; Linko to Falcon, 82.9 miles; Raleigh to Dryden, 48.1 miles; Vermillion to Kenora, 55.4 miles, and from Kenora to boundary of Manitoba, 32.8 miles.

Canadian Northern Ontario Railway.—Work of construction has proceeded steadily on the James Bay Railway between Toronto and Sudbury, a distance of 268 miles. 146 miles were completed and opened for traffic between Toronto and the junction with the James Bay Railway, 3 miles south of Parry Sound. Track is laid for a distance of 20 miles north of Parry Sound, and the grading is practically completed for the remainder of the distance to Sudbury, a farther distance of 99 miles.

The Key Branch, 7 miles in length from a point on the main line south of French River to the Georgian Bay at the mouth of the Key River, has about 25 per cent. of the grading completed. A good harbor has been obtained at this point from which it is expected large quantities of ore will be shipped from the mines in Hutton Township.

The Hutton Branch from Sudbury Junction to Moose Mountain Mines, a distance of 28 miles, has about 90 per cent. grading done and track laid on 7 miles.

The Ottawa-Hawkesbury line is under construction, with about 35 miles graded.

The Nipigon Railway is being relocated prior to starting construction.

Central Ontario Railway.—This company had 15 miles of new line under construction during the year 1906, between Bancroft and Maynooth. None of this distance was completed or opened for traffic, but it is expected that it will be finished during the coming summer. It is also expected that an additional fifteen or twenty miles will be completed as a part of their proposed extension to Whitney, a station on the Canada Atlantic Railway.

St. Catharines and Niagara Central Railway.—Seven miles of new line is under construction from Thorold to Fonthill, and is expected to be ready for operation in March. This line will be extended during the coming sea-

son from Fonthill to Welland, a distance of 45 miles. The main line from Port Dalhousie to Niagara Falls is being reconstructed by laying of new rails, 80 pounds per yard; by the substitution of steel and concrete structures for all existing wooden trestles, overhead crossings and bridges. These betterments are expected to be completed during the coming season.

Michigan Central Railway.—During 1906 a new second track was completed between Tilbury and Ridgetown, a distance of 30.48 miles, and between Springfield and Waterford, a distance of 33.72 miles. The entire distance is fully equipped with automatic block signals. There is under construction a new second track from Waterford to Hagersville, a distance of 12.75 miles, the grading of which is about 90 per cent. done, and it is expected track laying will start about January 15th. New second track is also under construction from Welland to Niagara Junction, a distance of 15.19 miles, the grading of which is all completed and track laid, with the exception of about two miles at the east end. This portion will be ready for service about February 1st. New second track is also under way from Niagara Junction to Bridgeburg, a distance of 2.10 miles, which is expected to be ready for service about March 1st. The automatic block signal system will be installed and put in service at the time the track is ready for use.

Toronto, Hamilton and Buffalo Railway.—An extension of 1.24 mile was constructed in the manufacturing district of the City of Hamilton, from their Belt Line to the works of the Canadian Westinghouse Company.

Temiskaming and Northern Ontario Railway.—That part of the T. & N. O. Railway, lying between New Liskeard and Englehart, a distance of 25 miles, has been practically completed, and was opened for traffic in October, 1906. It passes through the Townships of Dymond, Harley, Kearns, Armstrong and Evanturel, and has the following public stations: Uno Park, Thornloe, Earleton, Heaslip and Englehart.

The line is under construction for a farther distance northward of about 75 miles, running through the Townships of Dack, Chamberlain, Pacaud, Boston, Otto and Eby, passing through a stretch of 20 miles of unsurveyed land and the Townships of Cook, Playfair, Hislop and Bowman, where it reaches MacDougall's Chutes. This portion of the line will be completed and opened for traffic next autumn. The steel is laid to about 93 miles north from New Liskeard. The bridging is completed on this portion except a steel viaduct across the Wataybeag River. The line is further located to the proposed junction with the Transcontinental Railway, about 252 miles from North Bay. Tenders are now being asked for the construction of this portion. This part of the line traverses a good clay loam country, on the table land between the valleys of the Frederick House and the Abitibi River, and is well timbered, particularly with spruce.

Algoma Central Railway.—Several sidings and spurs were constructed during the year to take off logs, pulpwood and cordwood, traffic offering at the following points: At Gilbert, mileage 14.5, two sidings, 1,320 feet in length, to serve Bromley's Bros. mill; at mileage 26.5, a spur 310 feet long; at mileage 54.2, a spur 360 feet long; at mileage 56.4, a spur 660 feet long; at mileage 68.5, Chippewa Spur extended 1,000 feet; at mileage 62, a siding 880 feet completed.

At the Sault terminals, connection was made between sawmill and Veneer-mill tracks of 200 feet, and chip delivery track at Veneer-mill was constructed 400 feet long. At mileage 36.3 the diversion of the channel of Spruce Creek was commenced and completed, a work of considerable import-

ance. A steam shovel was utilized to fill the five wooden trestles between Spruce Creek and Searchmount, and also to take out some of the heavy curvature at the last mentioned point, and to widen embankments over some 20 miles of track at different points.

The telephone instruments along the line were renewed, the old ones being replaced with Bell Telephone Company's standard long-distance equipments. Twelve miles of additional wire was strung between Dam Creek and Superior Mines. At mileage 56.5 a summer cottage was completed at Trout Lake for the convenience of tourists.

Manitoulin and North Shore Railway.—Sidings have been constructed at Clara Belle Junction, 840 feet in length, and at Espanola 1,200 feet in length. The work of filling wooden trestles was carried on and, with the exception of one or two openings, all wooden structures were filled with rock and the decks of the trestles removed. Embankments were widened at a number of points and the roadbed placed in much better condition.

The work of extension of the main line west of Gertrude was commenced, and a force is still proceeding with the rock work in the cuts. The company have added to its motive power equipment a new model locomotive No. 27, manufactured by the Locomotive and Machine Company, Montreal.

Transcontinental Railway.—The surveys and first location of the Transcontinental Railway have been carried across the Province, an approximate distance of 758 miles. Location is now being revised and changes made where considered advisable.

Work of construction has been in progress under contract since early in the year for about 160 miles easterly from the Manitoba boundary. The line is about five miles north of the Canadian Pacific Railway at the Manitoba boundary, about 16 miles north of Kenora, and follows a course generally about that distance from the C.P.R. to Wabigoon Lake, where the lines diverge, the Transcontinental taking a course near the north Provincial boundary, while the C.P.R. runs south-easterly to Fort William.

Tenders are now being asked for the construction of 76 miles westerly from the Quebec boundary across the District of Nipissing. The line, as located, runs through unsurveyed lands north of Lake Abitibi, touches the north-east corner of the Township of Mortimer, passes through the Township of Fox and the north-east corner of the Township of Brower, and at the boundary between the Districts of Algoma and Nipissing, is about one and a half miles north of the Township of Lamarch.

Grand Trunk Pacific Railway.—Work of construction has been in progress on the G.T.P. Ry. on their Lake Superior branch line from Fort William to the junction with the main line of the Transcontinental Railway at Pelican Lake, a distance of 202.8 miles. The line follows very close to the main line of the Canadian Pacific Railway for a distance of 65 miles west from Fort William, following the valley of the Kaministiquia River. After crossing the height of land the line diverges to the north of the C.P.R., and is about 35 miles north-east of the C.P.R. at the junction of the branch with the main line of the Transcontinental Railway at Pelican Lake. An alignment having a maximum curvature of 4 degrees and a maximum grade from the west of 4-10 of one per cent. and from the east to the west of 6-10 of one per cent. has been secured throughout the full length of this branch line. So far no track laying has been done. The grading and bridging is progressing very favorably.

REVISED STATEMENT OF RAILWAY MILEAGE IN ONTARIO.

No.	Name of Railway.	Terminal Points.		Completed since Confederation.		At present under construction.		Total length in operation of each railway in miles.
		From	To	Length in miles.	Length in miles.	Length in miles.	Length in miles.	
1	Grand Trunk Railway, Main Line.	East Prov. Bound.	Point Edward.	457				
2	do Buffalo and Lake Huron Branch.	Fort Erie.	Goderich.	158				
3	do London Branch.	St. Mary's	London.	23				
4	do Galt and Doon Branch.	Galt.	Berlin.	7	4.5			
5	do Waterloo Junction Railway.	Waterloo.	Elmira.		10.25			
6	do Toronto and Nipissing Branch.	Toronto.	Coborouk.		88			
7	do Midland Railway, Main Line.	Port Hope.	Midland City.	65	54.53			
8	do do Peterboro' Branch.	Millbrook.	Lakefield.	13	9			
9	do Lake Simcoe Junction.	Stouffville.	Jackson's Point.		26.5			
10	do Whitby, Port Perry and Lindsay.	Whitby.	Lindsay.		46			
11	do Victoria Railway.	Lindsay.	Haliburton.		55.81			
12	do Grand Junction Railway.	Belleville.	Peterborough.		64.65			
13	do Belleville and North Hastings.	Madoc Junction.	Elldorado.		22			
14	do Toronto and Ottawa.	Madoc.	Bridgewater.		9			
15	do do Manilla Link.	Wick.	Manilla.		6.5			
16	do do Onenice Link.	Onenice.	Peterborough.		14			
17	do Port Dover and Lake Huron.	Port Dover.	Tavistock.		55.68			
18	do South Norfolk Railway.	Simcoe.	Port Rowan.		17			
19	do Chemong Branch.	Peterborough.	Chemong Lake.		9			
20	do Stratford and Huron.	Stratford.	Warton.		106.27			
21	do Owen Sound Extension.	Parkhead.	Owen Sound.		12.40			
22	do Georgian Bay and Wellington.	Palmerston.	Burlam.		26			
23	Grand Trunk Railway } Main Line.	Suspension Bridge.	Windsor.	229				
24	Great Western Div. }	Toronto and Hamilton Branch.	Hamilton.	33.5				
25	do do Loop Line Division.	Glencoe.	Fort Erie.		145			
26	do Kingscourt and Glencoe Link.	Kingscourt.	Glencoe.		20.6			
27	do Sarnia Branch.	Sarnia.	Sarnia.	51				
28	do do Petrolia Branch.	Wynning.	Petrolia.	7				
29	do Brantford Branch.	Harrisburg.	Brantford.	8				
30	do Brantford and Norfolk.	Brantford.	Tiltsouburg.		35.88			
31	do Lynden to Brantford.	Lynden.	Brantford.		4.12			

REVISED STATEMENT.—Continued.

No.	Name of Railway.	Terminal Points.		Completed since Confederation.	Completed prior to Confederation.	At present under construction.	Total length in operation of each railway or system of railways in miles.
		From	To				
32	Grand Trunk Railway, } Wellington, Grey	Harrisburgh	Southampton	27	102		
33	Great Western Div. } and Bruce	Palmerston	Kincardine		46		
34	do do } S. Extension	Hyde Park Junction	Wingham		69.75		
35	G. T. R. Western Div. } Welland Railway.	Port Colborne	Port Ballouise	25			
36	Northern Railway, } Collingwood Line.	Toronto	Meaford	94	21		
37	do Muskoka Branch	Barrie	Gravenhurst		53		
38	do Hamilton and Northern, Main Line.	Port Dover	Allandale		135.3		
39	do do } Collingwood.	Clarksville	Collingwood		40		
40	do North Simcoe Junction	Colwell	Penetanguishene		33.34		
41	Northern and Pacific Junction Railway	Gravenhurst	LaVause		111.5		
42	Magnetawan River Railway	Burks' Falls Station, G. T. R.	Parks' Falls Village.		1.01		
43	Toronto Belt Line Railway, Eastern Section.	Don Station, G. T. R.	Junc. Northern Ry.		8.50		
44	do do } Western Section.	Carleton, on G. T. R.	Swansea		4.33		
45	Canadian Pacific Railway, Main Line.	Ottawa	West. Prov. Bound.	57	1,150		2,691.92
46	do do } do	Ottawa	East Prov. Bound		66.40		
47	Algonia Branch	Sudbury Junction	Sault Ste. Marie.		180.25		
48	Brockville and Ottawa Railway	Brockville	Carlton Place.	46			
49	St. Lawrence and Ottawa Railway						
50	and Chaudiere Branch	Prescott	Ottawa	59.5			
51	Ontario and Quebec Railway	Toronto Junction	East. Prov. Bound	12	281.25		
52	do do } Don Branch.	Main Line	Toronto.		5		
53	do do } Detroit Extension.	London	Windsor		112.50		
54	Credit Valley Railway, Main Line	Toronto.	St. Thomas		119.13		
55	do do } Orangeville Branch.	Streetsville Junction.	Flora and Orangeville		61		
56	do do } Guelph Branch.	Campbellville	Guelph		15		
57	Toronto, Grey & Bruce, Main Line	Toronto.	Owen Sound	122			
58	do do } Teeswater Branch.	Orangeville	Teeswater	72			
59	do do } Wingham Branch.	Glenora	Wingham	4.75			
60	West Ontario Pacific Railway	Woodstock	London.	26			
	Atlantic and Northwest Railway	Renfrew	Eganville	19.25			

REVISED STATEMENT.—Continued.

No.	Name of Railway.	Terminal Points.		Completed prior to Confederation.	Completed since Confederation.	At present under construction.	Total length in operation of each railway in miles.
		From	To	Length in miles.	Length in miles.	Length in miles.	
61	Canadian Pacific, Lindsay, Bobcaygeon and Pontypool Railway	Barkton	Bobcaygeon		38.79		
62	do Sudbury and Kleinburg Branch	Bolton	Ronford		51.7	175.3	
63	do Guelph and Goderich Branch	Guelph	Goderich		31.96	56.04	
64	do Walkerton, Lucknow Railway	Proton	Walkerton			37.5	2,531.48
65	Michigan Central Ry., formerly Canada Southern, Main Line	Windsor	Suspension Bridge		226.80		
66	Michigan Central Ry., St. Clair Branch	St. Clair Junction	Contraight		62.2		
67	do do Amherstburg Branch	Amherstburg	Essex Centre		15.7		
68	do Oil Springs Branch	Oil City Junction	Eddy's		5.2		
69	do Petrolia Branch	Petrolia Junction	Petrolia		4.9		
70	do Leamington & St. Clair Branch	Comber	Leamington		15.9		
71	do Fort Erie Branch	Welland Junction	Fort Erie		17.4		
72	do Niagara Branch	Fort Erie	Niagara	30			378.10
73	Canada Atlantic Railway	East. Prov. Bound.	Ottawa		68.08		
74	do Ottawa, Arnprior & Parry Sound Ry	Ottawa	Scotia		212.60		
75	do Parry Sound Colonization Ry.	Scotia	Depot Harbor		51.20		
76	do Central Counties Railway	Glen Robertson	Hawkesbury		21		
77	do do do	South Indian	Rockland		17		369.88
78	Cobourg, Peterboro' & Marmora Ry., M'mora Line	Cobourg	Harwood	14.5			14.50
79	Kingston and Pembroke Railway	Kingston	Renfrew		103		103
80	Prince Edward County Railway	Pictou	Trenton and G. F. R.		32.44		32.44
81	Central Ontario Railway	Trenton, at G. F. R.	Bancroft		95	15	95
82	Ontario and Belmont and Northern Railway	Central Ontario Ry.	Belmont Mine		9.57		9.57
83	Bay of Quinte Ry., formerly Napanee, Tamworth and Quebec	Deseronto	Barnockburn		78.45		
84	do Harrowsmith Branch	Yarker	Sydenham		11.37		
85	do Old Line	Deseronto	Grand Trunk Ry.		3.5		93.32
86	Nosbonsing and Nipissing Railway	Lake Nipissing (S. E. Bay)	Lake Nosbonsing		5		5.00
87	Irondale, Bancroft and Ottawa Railway	Kinnouit	Bancroft		45		45.00
88	Brockville, Westport and Sault Ste. Marie	Brockville	Westport		45		45.00

REVISED STATEMENT. *Continued.*

No.	Name of Railway.	Terminal Points.		Completed prior to Confederation.	Completed since Confederation.	At present under construction.	Total length in operation of each railway in miles.
		From	To	Length in miles.	Length in miles.	Length in miles.	
89	St. Catharines and Niagara Central Railway.....	Niagara Falls.....	St. Catharines.....	12.50		7	12.50
90	Lake Erie & Detroit River Railway.....	Walkerville.....	St. Thomas.....	126.85			
91	do Erie and Huron Railway.....	Rondeau.....	Sarnia.....	70.47			
92	do London and Port Stanley Railway.....	London.....	Port Stanley.....				222.32
93	Canadian Northern Ry., formerly Port Arthur, Duluth & Western Ry., and Ontario & Rainy River Ry., Main Line.....	Port Arthur.....	West. Prov. Bound.....		287		
94	do Duluth Extension.....	Stanley Junction.....	Gun Flint Lake.....		66.54		353.54
95	James Bay Railway.....	Canada Atlantic Ry.....	Parry Harbor.....		3.7		
96	do Toronto and Sudbury Line.....	Toronto.....	Sudbury.....		146	19	149.7
97	Toronto, Hamilton and Buffalo Railway.....	Waterford.....	Brantford.....		18		
98	do do.....	Brantford.....	Welland.....		62.5		80.50
99	Tillsonburg, Lake Erie and Pacific Railway.....	Lagersoll.....	Port Barwell.....		35.33		35.33
100	Ottawa and New York Railway.....	Ottawa.....	Corrwall.....		55.00		55.00
101	Pembroke Southern Railway.....	Pembroke.....	Golden Lake.....		21.50		21.50
102	Algoma Central Railway.....	Sault Ste. Marie.....	Michipicoten June.....		69	101.50	
103	do Michipicoten Branch.....	Michipicoten Harbor.....	Main Line.....		22.10		91.10
104	Manitowlin and North Shore Railway.....	Sudbury.....	Gertrude Mine.....		13.50	5	13.50
105	Bence Mines and Algoma Railway.....	Bence Mines.....	Rock Lake.....		17		17
106	Temiskaming and Northern Ontario Railway.....	North Bay.....	Transcontinental Ry.....		138	114	138
107	Huntsville and Lake of Bays Railway.....	Peninsula Lake.....	Lake of Bays.....		1.5		1.5
108	Transcontinental Railway.....	East. Prov. Bound.....	West. Prov. Bound.....			758	
109	Grand Trunk Pacific Railway, Lake Superior Branch.....	Fort William.....	Transcontinental Line.....			202.8	
				1,447.5	6,158.2	1,591.14	7,005.7

STATEMENT OF ELECTRIC RAILWAY MILEAGE IN ONTARIO.

Number.	Name of Company.	Length of Line.		No. of Power Houses.		Remarks.
		Completed.	Under construction.	Steam power.	Water power.	
1	Berlin and Waterloo 3.02	5.52	.....	1	.....	Power purchased from Berlin Light Commissioners.
	Leased Line, Berlin and Bridgeport 2.50					
2	Brantford Street.....	7.	.....	1	.....
3	Cornwall Street.....	6.5	.....	1	1	
4	Grand Valley.....	21.	6.	1	.....	Power also hired from Brantford St. Ry.
5	Guelph Radial.....	6.	.....	1	.....
6	Galt, Preston and Hespeler... 9.00					
	Leased line, Preston to Berlin 7.25	16.25	.....	1	.....
7	Hamilton Street.....	21.807	.....			Power Supplied by the Cataract Power Co.
8	Hamilton & Dundas.....	7.25	.....			Power supplied by the Cataract Power Co.
9	Hamilton Radial.....	22.	1.	1	.....
10	Hamilton, Grimsby & Beamsville.	27.5	.....	1	.....
11	International Transit Company ...	3.3	.....			Sault Ste. Marie rent H.P. from Lake Superior.
12	Kingston, Portsmouth & Cataraqui	8.	.....	1	.....
13	London Street.....	33.3	.....	1	.....
	Metropolitan (See Toronto & York Radial).....					
14	Niagara Falls Park & River.....	11.85	.....		1	Subject to the control of Niagara Falls Park Commissioners.
15	Ottawa City Passenger.....	22.87	.....		1	
16	Port Arthur & Fort William.....	9.5	.....		1	
17	Peterboro' Radial.....	6.	.....		2	Power obtained from Peterboro' Hydraulic Power Co.
18	Sarnia Street.....	8.	.....			Power hired.
19	Sandwich, Windsor & Amherstburg.....	25.073	1.	1	.....
20	South-western Traction.....	18.5	9.5	1	.....
21	St. Thomas Street.....	7.5	.....	1	.....
22	Toronto & York Radial, Toronto Metropolitan Branch.....	28.	24.5	2	.....
	Toronto & Mimico.....	10.	.....			Power hired.
	Toronto & Scarborough.....	8.	2.	.....		Power hired.
23	Toronto Suburban.....	9.	.....	1	.....	Power hired.
24	Toronto Street.....	105.	.....			Two sub-stations, mileage includes turnouts and terminals.
25	Windsor & Tecumseh Electric Railway.....		10.	.....		When completed will be operated by the Sandwich, Windsor & Amherstburg Railway.
26	Woodstock, Thames Valley & Ingersoll.....	10.2	.....	1	.....
27	Windsor, Essex & Lake Shore Ry.		30.	1	.....
Total mileage.....		464.92	84.0	.....	

DRAINAGE WORKS.

The following municipalities have received aid in the construction of drainage works under the provisions of the Provincial Drainage Aid Act, 63 Vict. Chap. 8, during the year 1906:

SILVER CREEK AND CASTOR RIVER, TOWNSHIPS OF MOUNTAIN AND OSGOODE.

A grant of \$2,400.00 was paid toward this drain in the year 1905; a description of the course of the drain and estimated cost was given in the report of that year.

In consideration of the cost of the works exceeding the estimated cost by a large sum, an additional grant of \$1,600.00 was paid to the Treasurers of the Townships of Mountain, Osgoode, South Gower and Winchester *pro rata* of their original assessments.

ALLEN ARCAD DRAINS.

These drains are designed to benefit the lands and roads comprised in lots numbered 1 to 4 in the 10th Concession, lots 1 to 12 in the 11th Concession, and lots 3 to 17 in the 12th concession of the Township of Mountain, containing 5,750 acres, at an estimated cost of \$13,724.00.

These two drains, though independent, comprise one scheme and are under one by-law. One called the Allen drain, commences on Lot 2 in the 11th Concession of the Township of Mountain, runs easterly, and enters the Castor River on Lot 15 in the 12th Concession, then follows the Castor River to its junction with Silver Creek on Lot 17 in the 12th Concession.

A second drain, called the Arcand drain, commences between Lots 1 and 2 in the 11th Concession of the Township of Mountain, and runs westerly, crossing into the Township of Gower, and continues westerly and north-westerly to an efficient outlet in the Rideau River, on the east half of Lot 11, in the 9th Concession of South Gower.

In addition to these two main drains, a branch to the Allen Drain crosses Lots 9 and the west half of Lot 10, in the 12th Concession of South Gower. The total length of the drain is about $12\frac{3}{4}$ miles. The contract price of the drains is \$21,263.00. An examination of these drains was made by an Engineer of the Department in the month of November, who reported that the works were sufficiently advanced to warrant the payment of the grant. The amount of the grant, \$2,200.00, was therefore paid to the Treasurer of the Township of Mountain, the initiating municipality.

CASTOR EXTENSION AND EIGHTH CONCESSION DRAINS.

These drains, comprising one scheme and under one by-law, are extensions of the Petit Castor and Annable Creek drainage scheme in the Townships of Winchester and Russell. These drains are entirely within the Township of Mountain. The combined length is about $9\frac{1}{2}$ miles. The drainage area comprises about 19,000 acres, of which a large percentage is low swamp lands. The estimated cost of the drains was \$12,571.50. The cost of construction of the work, which is now practically complete, has greatly exceeded the estimated cost.

The outlet of the Castor extension drain is on Lot 24, in the 8th Concession. Its course follows up the bed of the old creek in Concessions 8 and 9, a distance of nearly three miles, thence south and south-westerly across

Lot 18, in the 8th Concession and Lots 17, 16 and 15 in the 7th Concession, to the road allowance between Concessions 6 and 7, thence westerly along the said road allowance to the easterly limit of Lot No. 12, in the 7th Concession, a distance of nearly $6\frac{1}{4}$ miles.

The eight Concession drain joins the Castor extension drain in the centre of the 8th Concession, on the west boundary of Lot No. 19. Its course follows in a westerly direction across lots 18, 17 and 16, in the 8th Concession, thence south-westerly across Lot 15 in the 8th Concession to the head line between the 7th and 8th Concessions, thence westerly along the north side of the head line to the centre of Lot 13, Concession 8. A proposed branch commences on the line between Concessions 8 and 9, and runs southerly along the said boundary to the centre of the Concession, where it joins the main line of the 8th Concession drain.

An examination of these drains was made by an Engineer of the Department in the month of November, who reported that the works were completed. The amount of the grant, \$1,600.00, was therefore paid to the Treasurer of the Township of Mountain.

BALDWIN AND MILLER DRAINS, MOUNTAIN TOWNSHIP.

The Baldwin Drain, nearly three miles in length, drains an area of 1,006 acres in Mountain Township. The drain commences on Lot 13, in the 1st Concession, and has its outlet into the south branch of the Nation River, in the Township of Matilda.

The Miller drain, a little more than $3\frac{1}{2}$ miles in length, drains an area of 1,425 acres in the Township of Mountain. The drain commences on the boundary road between the Townships of Matilda and Mountain, on Lot 6, and takes an easterly and north-easterly course, and finds an outlet into a stream on Lot 12, in the 2nd Concession.

An examination of these drains was made by an Engineer of this Department, who reported them as satisfactorily completed. The amount of the grants therefore, \$290.00 and \$220.00 respectively, was paid to the Treasurer of the Township of Mountain.

MCINTYRE CREEK DRAIN, TOWNSHIP OF DRUMMOND.

McIntyre Creek is a main outlet for a large numebr of award and municipal drains. The area of swamp lands assessed for benefit in the scheme now under contract is 2,805 acres. The area assessed for outlet is in all 16,557 acres. The principal work consists in the removal of rock and hard pan from Lot No. 13, in the 8th Concession, to the outlet of the creek into Mississippi Lake, on Lot No. 21 in the 9th Concession. The total length of the drain is about $6\frac{1}{2}$ miles, which extends from the sideline between Lots 8 and 9, Concession 7, to the outlet mentioned.

The estimated cost of the works is \$11,338.46, which will be exceeded before the work is completed. The Engineer in charge of the work having reported that the work was well advanced, that the principal part of the rock excavation was completed, and considerable of the earthwork finished, the amount of the legislative grant, \$1,200.00, was paid to the Treasurer of the Township of Drummond.

MEDONTE AND ORILLIA TOWNSHIP DRAINS.

The main drain, $7\frac{1}{4}$ miles in length, commences on Lot 12 in the 14 Concession of Medonte, and extends in a north-easterly direction following the

general line of Purbrook Creek to the point where it enters the North River on Lot No. 19, Concession 5, Township of Orillia. A branch drain, $1\frac{1}{2}$ miles in length, commences between Lots 14 and 15 in the 14th Concession of Medonte, and runs easterly and southerly until it joins the main drain on Lot No. 13 in the 2nd Concession of Orillia Township.

The area benefited and assessed for the work comprise 2,335 acres, chiefly swamp lands, whose value will be greatly enhanced by the construction of the drains. The total cost of the work is estimated at \$12,751.33. An inspection of the work was made on the 26th of November, when it was found that the work was completed in a very satisfactory manner from the outlet for a distance of three miles, and satisfactory progress was made with the balance of the work, sufficient to warrant the payment of the legislative grant. The amount of the grant, \$1,800.00, was therefore paid to the Treasurer of the Township of Medonte, the initiating municipality.

SNAKE RIVER DRAINAGE, TOWNSHIP OF BROMLEY.

An additional grant of \$100.00 was made towards this drainage scheme at the last session of the Legislature, to assist in meeting a deficit outstanding against the works.

BIG CREEK DRAIN, TOWNSHIP OF WEST TILBURY.

An additional grant of \$1,000.00 was made towards this drainage scheme to assist the initiating municipality in meeting a deficit outstanding against the work. To provide for the deficit the initiating municipality proceeded to make another assessment of all lands originally assessed. This method was opposed by the other municipalities, and would have entailed very heavy costs for the amount to be collected.

BARKLEY CREEK DRAIN, TOWNSHIP OF WILLIAMSBURG.

The length of the Barkley drain is nearly eight miles. The outlet is into the Nation River, on lot No. 9 in the 2nd Concession, Township of Winchester. It follows the course of the stream across Concession 2 and 1. Winchester Township: crosses the 8th Concession of Williamsburg on lot No. 27; in the 7th Concession it runs easterly, across lots 27 to 21, thence southerly and easterly across lots 21, 20, 19, centre commons, lots 18 and 17 and finishes on lot 17, in the 6th Concession. The area assessed is about 7,000 acres, a considerable portion of which was swamp lands. The total cost of the drain was \$9,512.00. The work having been found satisfactorily completed, the amount of the legislative grant, \$1,000.00, was paid to the Treasurer of the Township of Williamsburg.

DAUPHIN DRAINAGE WORKS, TILBURY EAST.

The Dauphin Drainage Scheme comprises about 2,150 acres, situated in what is known as the Chatham Plains, in the Township of Tilbury East. An earth embankment has been constructed around these low lying lands for protection from the waters of Jeanette's Creek on the south, and the River Thames on the north. Internal drainage is effected by pumping over the embankments, the lands being lower than the waters of Lake St. Clair in times of high water. The embankments are raised to a height of about 9 feet above the normal level of Lake St. Clair.

The works were originally constructed in the year 1895, at the cost of \$28,202.00. During the years 1902, 1903, and 1904, by reason of excessive rainfall, and consequent heavy floods, the annual assessments for pumping and maintenance were inadequate to meet the cost. In the spring of the year 1904 an unprecedented rise in the waters of the River Thames occurred. The water broke over the Thames embankment and submerged the entire drainage area to a depth of from 5 to 7 feet. Heavy losses were sustained by the drowning of stock, the flooding of granaries and barns, and the loss of the crop for the season. The taxpayers were consequently unable to meet their payments, and an indebtedness has accrued amounting to \$8,200.00. The estimated cost of repairing the works damaged by the flood is placed by the Engineer at \$15,180.00. The drainage taxes on these lands are exceedingly heavy.

A grant of \$3,000.00 was made at the last session of the Legislature towards this drainage scheme, and the amount of the grant was paid to the Treasurer of the Township of Tilbury East.

I have the honor to be,

Sir,

Your obedient servant,

R. P. FAIRBAIRN.

Engineer Public Works.

REPORT OF THE SUPERINTENDENT OF COLONIZATION ROADS.

To the Honorable J. O. REAUME,
Commissioner of Public Works, Ontario:

SIR,—I have the honor to submit a report of work in connection with Colonization Roads during the year 1906.

About two hundred and twenty miles were opened; over seven hundred and fifty miles repaired, ditched and improved, with bridges totaling a length of three thousand one hundred feet or thereabout.

Several contracts were let for new roads in Temiskaming District, as hereafter noted, and with other works represent thirty-seven miles of new work, and thirty-nine repaired and improved.

The works were as follows:

NORTH DIVISION.

Aubrey Township Road.—A portion of this road was cut out some years ago from Anderson's pit, C. P. Ry. north about three miles. This year a mile and three-quarters were fully opened, crosswayed and gravelled. The road now reaches to within 500 yards of Wabigoon River, where a bridge is required. Forty-two German settlers have located in the vicinity during the last three years.

Aweres Township Road.—From the town line between Tarentorus, and Aweres northward almost a mile was made.

Barclay and Wabigoon Road.—A work between Dryden and Elm Bay, two miles having been improved, including half a mile of crosswaying. It is the main road in the district.

Burpee and Cockburn Island.—From lot 35, concession 4, Burpee, east to the town line a mile and a half of grading and gravelling was done, and from lot 13, concession 8, east to lot 18, concession 8, brushing, grading and gravelling was effected for a mile and a half with some work from lots 35 to 37 on Lake Wolesley road, 3 miles altogether.

On Cockburn Island between T and H concession and range 5, one hundred rods of repairs, and on concession 12, in front of lot 14, nearly eight rods were worked over, while on the 15th side road, concessions 9 and 10, there were seventy rods of grading and ditching.

Blue, Pratt and McCrossen Road.—From a mile north of the south post between sections 14 and 15, north, beyond sections 22 and 23, and 26 and 27, a mile and a half was opened and grubbed with necessary corduroying.

Barrie Island and Mills Township.—In the township of Mills, opposite lots 8, 9 and 10, the road was opened and gravelled for $\frac{3}{4}$ of a mile, with an equal length on the 6th concession across lots 14 to 17, and consisting of stumping, stoning and grading with culverts.

Bruce Mines and Sault Road.—From lot 4, concession 1, Plummer, a mile and a half was gravelled and graded. A road was also opened on block A at lot 5 to lot 9, a mile and a half to the south shore of Otter Lake, three miles altogether.

Bass Lake Road.—On the fourth concession of Aberdeen, more than half a mile of excellent work was done representing 20 rods of grading, 10

rods of stoning and grading a heavy hill with 50 rods opened through heavy timber, cut out 60 feet wide, and graded 24 feet in the centre, opening a road to Bass Lake, excepting a small bridge yet to be built.

Blind River and Algoma Road.—Three and a half miles were opened from near Blind River, towards Algoma Mills. The district is somewhat rough, and there are yet about four miles to be opened to make a good general highway.

Bellevue Road.—From Bellevue Station, on Algoma Central Railway, passing through sections 34, 37, 38 and 39, Vankoughnet to a saw mill on section 34, a road about three and a half miles long is represented, of which this season, a mile and a half was improved, and a mile between sections 38 and 39 was repaired. This road is expected to become the general highway from Vankoughnet to Sault Ste. Marie, a length of about twenty miles.

Bar River Bridge.—A bridge over Bar River, in the township of McDonald, about eighty rods north of the C. P. Ry. crossing, the structure is 55 feet long and well built.

Burris Township.—Three miles opened, 40 feet wide, and grubbed 16 feet in the centre. The work is between lots 8 and 9, following a good general location to Clancy township. Some 200 rods of crosswaying are yet required to make the road generally useful.

Bright Township, Concession 4 Road.—Eighty rods cut out and stumped, one hundred and fifty rods graded, and fifty-six rods crosswayed and gravelled, one mile altogether.

Bright Township.—A continuation of last year's operations in Bright to Iron Bridge road. Two miles were worked over from "Fowler's Corners," including half a mile cut out as new work. The road is between Dean Lake and Iron Bridge.

Clarke's Bridge Road.—Four cedar piles driven at east end of bridge, and a cut of 95 yards and 5 feet deep, and 62 yards of grading, and a large culvert constructed.

Coffin Township Road.—A road reported as almost impassable before the expenditure of this year's grant, which was improved two miles and a quarter, putting the road, the inspector says, in first class condition.

Creighton and Manitowlin Road.—In the township of Creighton, from lot 10, concession 6, to lot 2, Fairbank, a mile was well improved.

Centre Line Road, Bruce Mines.—Beginning at railway crossing and thence north one mile, leading to Cariboo, the road was cleared and largely graded.

Campbell Township Road.—On the town line between Campbell and Carnarvon from concession 14 to concession 16, Campbell, a mile and a quarter of grading and gravelling; on the 8th concession, 200 rods were gravelled, and 100 rods filled with stone, while on concession 12, 180 rods were graded and gravelled; some three miles as a total.

Conmee Township Roads.—Two miles opened in concessions A and I. The work was somewhat expensive, being largely crosswaying through Muskegs, involving ditching, draining and grading. The road is a main highway, and the outlay this year is of great value.

Carpenter and Kingsford Road.—Two miles and a quarter opened with one hundred and fifty-eight rods of crosswaying—some eighty rods are yet unfinished.

Chapleau Township.—It is understood that about a mile of road was opened, but the full grant was not spent.

Dinorwic and Sandy Lake Road.—Repairs were made over nine miles. The road is yet in poor condition, but of course better for this year's work.

Dryden Road.—A road to the railway at Dryden, and the inspector says was satisfactorily repaired over a length of three-quarters of a mile.

Drury, Dennison and Graham Road.—From the town line of Houghton on the main Government road five miles were repaired on what is locally known as Drury road, and upon another portion called Victoria and Salter, four miles were improved. The Government gave \$500, and the balance upon an expenditure of about \$1,125 was contributed by the municipalities.

Dean Lake and Blind River Road.—A continuation of last year's work, covering two miles, of which half a mile was new work.

Dean Lake Mine Road.—On the north boundary of the Indian Reserve, township of Thompson, from Mississauga River, east a mile and a quarter, was opened, and thence north a quarter of a mile for the accommodation of settlers, and for miners at the end of the road.

Dorion Township.—This work represents a mile and three-quarters of excellent repairs with nine hundred feet of side cutting and a quarter of a mile opened on lot 5, concession 4, to the C. P. Railway.

Dilke Township Road.—Two miles and a quarter of substantial work between sections 4 and 5, north of Dilke and Nelles, and between sections 33 and 34, Dilke, north, a mile was repaired.

Dobie Township Road.—A mile and one-eighth was opened 40 feet wide and grubbed 16 feet wide. In the above length half a mile of crosswaying was laid through a cedar swamp. Twelve settlers are accommodated by this road, in addition to the advantage of a general highway.

Espanola Roads.—From the boundary line between Hallam and Merritt extending to the town line between Baldwin and Nairn, about seven miles were improved.

Eton Township Road.—Between the townships of Eton and Wainwright, a mile was opened and small bridges were built. Half a mile was opened between lots 4 and 5 through a cedar swamp.

Fossil Hill.—Repairs upon a heavy hill to make the road generally practicable. Altogether two miles were improved. The road is on Manitoulin Island.

Gordon Lake Road.—A mile and a quarter of grading over a rough section.

Gordon Lake and Sault Road.—A mile of work from Gordon Lake north.

Galbraith Township Road.—Between lots 9 and 10 and between concessions 2 and 3, half a mile was double ditched, and with an off take drain has made a good road.

German Settlement Road.—A mile and three-quarters of an old timber road was opened, upon which some twenty German settlers are located and working upon their farms. The road is from "Anderson's Pit" on the C. P. R'y, lot 10, con. 2, Mutrie, through lots 9 and 10, con. 3, and the east side of lot 9 between concessions 4 and 5 to Wabigoon river.

Gore Bay to Providence Bay Road.—Grading and gravelling from "Hope Hill" to Long Bay, and on other portions between Allan and Gordon and elsewhere, representing about three miles of improvements.

Gordon and Allan Roads.—This work was done by the municipality and is understood to be satisfactory as follows:—A mile and a quarter on the road between Gore Bay and Burpee of grading and gravelling, costing over \$300. Another mile was improved for about \$100, and on the 8th line of Gordon, leading to Barrie Island, fifty rods were graded with other work. On Allan, con. 8, stone filling was done, costing \$112. Sixty rods of work were done in the same township, being stoning, grading and gravelling, and on con. 10 of the same township over lots 25, 26, 27, \$200 were spent. Other repairs were made on 20th side line on the 6th concession, on the 8th concession, and into Mills township, con. 7, and on con. 4, Gordon, a bridge was repaired on lot 11, giving at least three miles of excellent work.

Gordon, Allan and Billings.—About three miles of work in the above named townships, namely:—In Allan, on the 10th concession, across lots 23, 24, 25; on the town line between Allan and Gordon, opposite lot 30; on the 5th and 6th side road, and in the township of Gordon from Indian Point bridge, while in Billings, on the 20th side line good work was accomplished.

Gamble's and Graham's Mill Road.—Between sections 19 and 20 of Victoria, three-quarters of a mile of grading and ditching. A new work.

Goulais Bay Road.—The Batchawaning road was opened many years ago. For many miles there are no settlers and probably never will be, of, at any rate, farmers. This year two miles of a portion which was very rough and stony was made good. The length of road between Sault Ste. Marie and Goulais Bay on this road is about twenty miles, and if traffic between these points is maintained, a very considerable expenditure must be made.

Gillies, Scoble and Pearson Road.—Three miles were worked over, and such a good road made that it is expected the residents will in future maintain it.

Honora to Little Current.—The clearing out, ditching and grading of two miles and a half.

Herminia Mine.—From the C. P. R'y north between sections 27 and 28 Salter, a length of two miles and thence west a mile and a half to Herminia Mine was well opened.

Hilton Road.—From 20 side line Hilton, St. Joseph Island west on K line, work was done sufficient to open a road to Huron line, a distance of $6\frac{1}{4}$ miles. Again, on what is originally known as Centre road, work was done from Con. D. to con. F., a mile and a quarter, with another half mile of stumping and clearing.

Howland and Bidwell Road.—Two miles of opening, grading and graveling.

Haviland Fenwick Road.—On this road a bridge was built, having a height of 20 feet and length of 54 feet. The hills upon each side of the bridge were reduced in grade by the excavation of about 1,500 cubic yards of material.

Isbester Road.—In the township of Laird from Isbester siding to Sylvan Valley this road, which was opened some two years ago, was this year gravelled over one mile of its length, making a fairly passable line to Isbester station.

Johnson and Plummer Road, and from Cariboo Lake to Port Lock Mill. A mile and a quarter gravelled through a swamp, half a mile brushed out, a bridge built with material furnished by the municipality, and another mile of grading.

Johnson Township, through Hincks Location.—A road from Bruce Mines north to Cariboo Lake through Hincks location. Two and a half miles were cleared out and graded.

Johnson Con. 3 Road.—Two miles of swamp gravelled, and with other repairs has made a good road.

Jocelyn Township, West Boundary.—A mile and a quarter of repairs in Jocelyn township between lots 56 and 59, at the northwest end of St. Joseph Island.

Kagawong to Gore Bay.—Across lots 6 to 14, con. 8, two miles and a quarter were gravelled and well improved.

Korah Road.—In section 20, a road was chopped out 271 rods long and partly grubbed and graded. Again, on the southeast quarter of sec. 10, 1,137 yards were opened, grubbed and levelled, and with ditching represents fully a mile and a quarter of road opened.

Lybster and Marks Road.—From 34 mile post north, a quantity of work was done in ditching, bridges, culverts, corduroying, stumping and grubbing, equal to a mile and a half of new work.

Lefroy Second Side Line.—A road between Lake Shore and Bruce Mines roads. A mile of grading was done with the covering of a bridge and two cedar culverts with plank.

Lavalle and Burris Road.—Four miles cut out forty feet wide and grubbed sixteen feet in the centre. The road is from the south limit of sections 34 and 35 Devlin north.

Lumsden Township Road.—A road between the townships of Lumsden and Rayside from lot 2, con. 1, Lumsden, west one mile.

McIntyre Township Roads.—Exceptionally good work is in this case reported, being a mile and a half of new work, a mile of which was well graded and half of the balance corduroyed, with half a mile of ditching and 10 culverts introduced.

McLennan and Bar River Road.—This work is on the north half of section 16, Laird, and was the making of a road about an almost impassable hill. Half a mile of heavy timber was cut and the length grubbed and graded, and with heavy stone filling, explains what might appear a somewhat large outlay in the distance.

McDonald, Meredith and Aberdeen Additional Roads.—Two miles of general repairs and improvements.

McLennan Road in Laird.—A road east from Port Finlay and Echo Bay road, from lot 17, going a half a mile, which was graded and ditched with several culverts of considerable size.

Morrison Corner and Ross Township Road.—This work includes a mile and a half of grading with a machine, with 65 rods of road opened.

Mellick and Jaffray Roads.—The appropriation was used chiefly in opening the road to connect with the Grand Trunk Pacific Transcontinental line. From Kenora limit on S. 487 Mellick, the road was repaired last year and put in fair condition. This season the work began at the said S. 487 and continued to con. 4, Mellick, a mile and a half of grading with another mile of crosswaying with culverts and ditches. Altogether, about

four miles have been opened, reaching to Black River, and the balance, some five miles, is to be opened for winter traffic.

Meldrum Bay and Silverwater.—Thirteen miles of repairs between Meldrum Bay and Silverwater, on Manitoulin Island.

Miscampbell Road.—Beginning between sections 33 and 34, Crozier and Miscampbell town line, thence west 86 chains to the corners of sections 32 and 33, Crozier, and concession 1, lots 8 and 9 and thence one mile and a quarter, making over a mile and three-quarters of new road opened 40 feet wide.

Morley (Between Sections 8 and 17).—Over three miles were done, representing 180 rods of stumping and grubbing, 184 rods of corduroy and 480 rods of ditching. The work was between 9 and 16, 8 and 17, and between river lots 53 and 54.

Morley and Pattullo Town Line.—There were three miles grubbed and stumped, and ditches made upon each side of the road at average depth of 2½ feet and width about 4 feet wide, the material being used in rounding the roadway and forming a very permanent work.

Mather and Dobie Town Line.—Two and three-quarter miles opened on the town line from the east side towards Tait and Mather. Three hundred and twenty-four rods of crossway were laid, with some small bridges and approaches.

Michipicoten Road.—In the district the inspector reports some twenty-five miles more or less improved. The work was upon Wawa Road, Michipicoten Road, the road into the mining range and to the Hudson Bay Mission ground. These roads are chiefly for the use of mines and mining prospectors and without which exploration would be very difficult.

Massey Township, from Salter and May.—Improvements began one mile east of Massey on the main road to Webbwood and was improved over a mile and a quarter.

Nairn and Lorne Townships.—From lot 1, Nairn, to lot 4, Lorne, two miles were cleared, graded and ditched, and half a mile opened to the road leading to Spanish River.

Nelles, Between Lots 4 and 5 and North.—Two miles and a quarter were opened and grubbed and 171 rods of corduroying laid, with top drains and culverts.

O'Connor Road.—On the line between lots 8 and 9, concessions 4 and 5, gravelling was done and tap drains opened; and between lots 10 and 11 there was good work with another hundred rods of brushing, ditching and corduroying between concession 6 and 7, lot 2 as a contract. Altogether over three miles were well improved.

Oliver and McIntyre Town Line.—Through concessions 2 and 3 and 4 and 5, three-quarters of a mile of gravelling was done and other improvements made.

Pattullo Township Road, South.—This work is not fully reported beyond the accounts which show a satisfactory result.

Plummer and Aberdeen, Concession 2.—Beginning at lot 3, concession 2, Plummer, crossing first and second concessions a hill ten feet high and sixty-five feet long was cut down, and a large culvert constructed under the embankment. There were also two miles of grading and ditching with four culverts, and a mile and a half of heavy timber cut out through a stony section. Another mile was cut out and brushed, making a good road and representing two miles and a half of new work and over two miles of repairs.

Port Finlay and McLennan Road.—A road between McLennan and Port Finlay dock in the township of Tarbutt. The work was half a mile of grading and gravelling, making an almost impassable road into a fairly good one for ordinary use.

Port Finlay and Echo Bay Road.—From the town line between Tarbutt and Laird a mile and a quarter was cut north and 80 rods graded. Half a mile was also graded between sections 31 and 32, lots 18 and 20, opening a good road to Echo Bay Station and accommodating numerous settlers.

Parke Township Road.—Between sections 4 and 5, Parke, there was opened from the town line of Prince and Parke, south half, a mile as a new road. Again on the town line between the townships mentioned in front of sections 34 and 35, Prince, the road was ditched and graded over a length of a mile and a quarter.

Parkinson Township Road.—This road is on the banks of White River from a bridge at Bell's Lake. A mile and a half has been cleared and graded with 96 feet of crosswaying and 107 rods of heavy gravelling, completing the road the inspector says, in first-class shape as far as there are any settlers.

Plummer, Aberdeen, Johnson and Aberdeen Additional.—A new road running east from Gordon Lake road which latter runs northerly. The first 55 rods were rounded with a grading machine, the right of way having been purchased by the municipality. One hundred and five rods were cut out eastward through a green bush and thence the road is southward between lots 2 and 3 to concession 4 in Aberdeen, amounting to nearly three miles of grubbing, grading and general opening of a needed highway.

Patton Township.—A mile and a half of chopping, slumping, ditching and grading from the west side of lot 8 east between concessions 4 and 5, all through green timber.

Providence Bay.—From lot 2, concession 12, to lot 9; and from lots 13 to 18, three miles were repaired on the Manitowaning and Providence Bay road.

Prince Township Roads.—The line in section 34 has been improved and straightened for half a mile. Again on the line between Prince and Korah (section 25, Prince) half a mile of swampy road was ditched and graded with additional work on sections 11 and 13 for the general benefit of settlers.

Pennefather Township.—On the town line between Pennefather and Korah from between sections 34 and 35 of the first named township to about centre of section 36 and thence south through section 1, Korah, to meet a road previously constructed, about two miles were opened through a new section, making a highway for many settlers.

Rockville to Lemans.—A mile and a half improved.

Rat Portage Road, East.—From Kenora east to Black Sturgeon Lake narrows the road roughly opened several years ago was improved this year over a length of three miles to the "narrows" where a bridge will be necessary if settlers across the river may use the road.

Slate River Bridge.—A bridge eighty feet long with a 40 foot span and 40 feet of approaches.

Sanford Township Roads.—About four miles of work in several portions of the township, chiefly on the 5th and 6th concessions, through lots 23 and 24; repairs between lots 8 and 9 and elsewhere.

Stanley Bridge Road, East.—From the road allowance between concessions A and 1 south of the river, and following on the west side of lots 22

and 23 north towards river 2,830 feet; thence westerly to creek on lot 26, one mile completing the work anticipated, namely, to make a good road to where a bridge is expected to be constructed by the municipality.

Stanley Bridge, West.—The widening three miles through a green bush with culverts and some necessary ditching.

Sylvan Valley Road.—Two miles of grading and general repairing and gravelling, the work being in the township of Laird upon Sylvan Valley and Echo Bay road.

Sturgeon Creek Bridge.—A bridge fifty-six feet long with span of 20 feet and two of 12 feet each erected over Sturgeon Creek in the township of Shenston.

Silver Mountain Road.—A road from the mine indicated to the railway at about mile post 36. Improvements were made at several points and chiefly the building of three bridges, aggregating a length of 113 feet. Forty loads of gravel and sand were laid with 150 feet of corduroying.

Saller and Victoria Town Line.—On the town line named from one mile north of the C. P. Ry. over half a mile of road was opened, and east another half mile was cleared and graded.

Sandfield and Tehkummah.—A bridge was repaired and grading done between Monitowaning and Providence Bay, but chiefly on the 2nd concession of Tehkummah. A mile and three-quarters in length of grading and brushing was done between McDonald's Mills and Manitowaning.

St. Joseph Island.—On A and Huron line 185 rods were cut through green timber and partially stumped and graded, the settlers gravelling 40 rods to complete the road for general use. Two hundred rods of ditching with repairs from W. concession to the lake.

Tait and Mather Town Line.—From e $\frac{1}{4}$ stake of section 25, between Tait and Mather southward, a mile and a half was opened to s. e. stake of section 24. From thence grading was done from $\frac{1}{4}$ section stake, section 25, Tait., half a mile. More than half a mile of crosswaying was done upon the road.

Tarentorus Township.—Between sections 3 and 4 of the north boundary the road has been opened as a continuation of the Aweres road, and through section 21. Three-quarters of a mile of excellent grading was done with the object of giving settlers of Aweres and elsewhere a road to Sault Ste. Marie.

Tenby Bay and Jocelyn.—A continuation of the 5th side line of St. Joseph township on St. Joseph Island and the work amounting to one hundred and ten rods of gravelling north from Chesterfield saw mill, with an additional eighty-five rods of gravelling and forty rods of ditching.

Thessalon River Bridges.—One bridge was built on lot 5, concession 3, and a second on lot 11, concession 1, Aberdeen. Both are pile structures and the total length nearly two hundred feet.

Tait Township Roads.—From near the south corner of sections 22 and 23, Tait, north for three miles to north boundary, logging, stumping and grading was accomplished, making a good road throughout.

Vanhorn Roads.—On the first side line of Vanhorn to the 6th concession three-quarters of a mile was opened, a quarter of a mile grubbed, two bridges built and a considerable amount of cutting and filling to make a good travelable road.

West Bay and Slash Roads.—From Slash to Gore Bay \$200 were spent on the 6th concession of Tehkummah, and on the town line between Tehkummah and Assignac improvements were made. This work is on Manitoulin Island.

Waters Township, Towards Whitefish.—A work consisting of stoning, grading, ditching and clearing, with culverts. The improvements were from Copper Cliffe Station, continuing through the township of Waters some ten miles on the main colonization road from Sudbury westward.

Wainwright Township Roads.—On the town line between Eton and Vanhorn a mile was opened and a considerable quantity of crosswaying done, and again going south to Oxdrift across lots 4 and 5 and into lot 3 two miles and a half were cut out 30 feet wide.

WEST DIVISION.

Broadbent and Edgington Road.—Work from lot 22 of McKellar and Christie town line and through lots 20 and 21 into Christie, a mile of work was accomplished.

Bethune, 5 Side Line Road.—About two miles of work on concessions 5 and 10.

Balkwell Road.—There were 220 rods of ditching, and 200 rods of gravelling, and 400 rods of filling, equalling a mile and a quarter of good work.

Broadbent, and Edgington Road.—From lot 22, on McKellar and Christie town line road, eastward into Christie, over two miles were improved.

Booth Road.—A road opened into Matchedash township for general traffic. It was expensive generally, requiring 13 culverts, heavy clay covering, and a great quantity of gravelling. In some instances, long poles were driven as a necessity to support the roadway—other expenditures were made on many other roads and fully reported by the inspector.

Brandy Creek, Port Carling.—Work was done on Lake Shore Road, in township of Monck, in building bridge and approaches. Stone abutments were built, and the bridge shortened 35 feet; also from Port Sandfield two miles and a half were well improved on the Port Carling and Sandfield road.

Chaffey and Franklin.—Between Huntsville and Novar, two miles and a half of good work was done, and another mile and a half from lot 31, concession 2, Chaffey, on the Chaffey and Cardwell road. Two hundred loads of gravel were laid over the road.

Christie and McKellar Road.—From the boundary between Humphrey and Christie, to lot 18 of the latter township, a mile and a quarter was ditched and graded.

Carling Township.—North-west Road. Four and a quarter miles in the township of Carling, repaired from lot 15, concession 9, to lot 4, in the 4th concession.

Croft Township, Side Road.—A new bridge 65 feet long was erected, and 400 rods of repairs made between lots 30 and 31, through concessions 12 to 14, Croft.

Commanda Lake Road.—From lot 23, concession 5, Patterson, to lot 27, concession 4, three-quarters of a mile were ditched and graded with over half a mile chopped out.

Distress River Road.—In the township of Chapman, between concessions 8 and 9, two miles and a half of repairs were made across lots 3 to 12, good work being reported.

Dunchurch and James Bay Road.—A work from lot 7, concession 7, Hagerman, to lot 8, concession 7, Burpee, a length of five miles, opened through a bush.

Dalton and Washago Road.—General repairs.

French River Road.—An incompleted work. Reports will be received later.

Golden Valley Road.—In the township of Hardy, between concessions 6 and 7, across lots 7 to 13, three-quarters of a mile of repairs and improvements were made.

Hollow Lake Bridge.—An unfinished work of last year, but now completed.

Humphrey Township Road and Bridge.—One hundred and twelve rods of excellent work from lot 78, to lot 76—a difficult and heavy undertaking.

Jarlsburg Road.—From Bear Lake Station, lot 8, concession 11, Monteith, half a mile was graded, and a bridge 25 feet long erected.

Kill Bear Point Road.—One hundred and seventy rods were opened from lot 37, concession 5, Carling, to lot 28, and thence down the town line between lots 28 and 29. A new road.

Little Pickerel River Bridge.—A bridge 50 feet long, with main span of 17 feet, with two hundred yards of grading.

Laurier Township.—From concession 9, Laurier, on the 5th side line to concession 10, a mile and a quarter of road was opened.

Lorimer Lake Road.—Three and a quarter miles of work between concessions 8 and 9, from lot 1 to lot 5, concession 5, in Ferguson and Hagerman.

Little Doe Lake Road.—A road through or about lot 34, concession 10, Chapman.

Maple Lake Station and Rosseau Road.—A road in Christie and Monteith. Two and a quarter miles were well improved.

Machar and Lount Township Roads.—In the township of Machar, on the 5th side line, two hundred and eighteen rods were graded and ditched, and from lot 20, concession 1, to lot 21, one hundred and forty rods of crosswaying was laid and an equal length repaired. Again between lots 28 and 29, to Eagle Lake Bridge, two hundred rods were graded, and crossing the bridge one hundred and twenty-five rods were improved on lot 25 in Machar.

Monteith Township, 5 Side Line.—Three-quarters of a mile of work opening a road to the 8th concession, and with crosswaying and other improvements represents about a mile and a quarter of substantial improvements.

Muskoka Road.—In the County of Simcoe, through concessions 10 to 11, the road was graded and gravelled.

Matchedash Road.—Almost a mile of work was done on what is known as "Booth line," the balance of the appropriation, some \$370.00, being spent on 12 and 13 side line, the 3rd and 4th side line, the 1st and 2nd side line, concession 1, making altogether very good work as reported.

Muskoka Road.—Seven miles were repaired through the townships of Morrison and Muskoka.

Medora, Wood and Baxter.—Over five miles of road were improved in the townships named, and fully described by the inspector in his reports.

Macaulay and Brunel.—From lot 15, concession 2, Brunel, three and a half miles of repairs were made on Brunel and Huntsville Road. Again, a mile of heavy work in making a deviation on Baysville, the right of way, having been secured by the municipality. Also from lot 19, concession 8, Brunel, two and a half miles were improved for an expenditure of \$200.

McLean, Ridout and Sinclair.—Seven miles and a half were repaired on the town line between Franklin and Sinclair; from Baysville westerly, and from the town line between McLean and Ridout, on the old Baysville and Dorset Road, the latter covering four miles.

McDonald Leatherdale Road.—On the side line between lots 20 and 21, from the town line of Orillia and Medonte, to lot 13 of the latter township, a new road was opened, the right of way having been where required, purchased by the municipality.

McMurrich, 25 Side Line.—Two hundred and twenty-four rods were cleared out, and partially graded.

North Grand Road.—A mile and three-quarters of blasting and grading on the "Northern Road."

Nipissing Road.—Between lots 149 and 156, a mile and a quarter was well repaired, and a bridge at Commanda replanked.

North Himsworth, 5 Side Line.—From Westphalia Road, almost half a mile of ditching and grading.

Nipissing and Powassan.—A mile and a quarter of road was opened from Nipissing Road, between lots 10 and 11, through concessions 8 and 9, and made fairly passable.

Oakley, Draper and Ryde.—In the township of Ryde, from the town line of Draper, two miles of gravel were laid. From lot 8, concession 6, on Franklin Road, extending to Fox Point, at lot 10, concession 5, two and a half miles of general repairs were made. This latter is the main and only road in the locality to Lake of Bays, where the general interests of settlers are centred. Again, from the town line between Draper and Oakley, three miles and a half were improved to lot 26, in the 6th concession.

Perry, 15 and 16 Side Line.—On this side road, in concessions 11 and 12, about a mile was chopped out, and more than half the length graded.

Port Severen Road.—Three-quarters of a mile of macadam road made, and therefore of a permanent character.

Ryerson and Spence Road.—Half a mile of work on Ryerson Road, between concessions across lots 15 to 18.

Stisted and Cardwell.—Four miles of repairs on the south Cardwell Road, from the town line of Humphrey. Two bridges were built, the municipality of Cardwell supplying most of the timber.

Stephenson and Watt.—From lot 15, concession 7, Stephenson, seven miles and a half towards Huntsville, were repaired, and from lot 21, concessions A and B, Parry Sound Road, three miles were improved.

Spence Township.—Between lots 20 and 21, through concessions 9 to 11, about a mile and a quarter of work.

Trout Creek and Glen Roberts Road.—One hundred and ninety-three rods graded on the 25th side line of Himsworth, between Trout and Glen Roberts.

Westphalia Road.—On the 4th concession of Himsworth, one hundred and sixty-four rods were well improved, and from lot 21 to lot 26, in the same township, a mile and a quarter of repairs were made.

EAST DIVISION.

Algona South Roads.—On the Sabastopol and Algona Road, \$100 were spent upon road improvement. On the Eganville and Opeongo, across lots 10 to 13, in South Algona, a mile of work was done, and between concessions 7 and 8, North Algona, a mile was opened.

Alice Township Roads.—Between Fraser and Alice, half a mile of repairs. Work was done across lots 6 and 7, on the 7th concession, largely in cutting down a heavy mill approaching Indian River. A mile was repaired crossing lots 30, between concessions 3 and 4, with 5 culverts and a small bridge. Across lots 17 and 18, in Wilberforce, about three-quarters of a mile; on the 10th concession, across lots 26 and 27, half a mile; and across lots 16 to 19, a mile of good work.

Algona North, 8th Concession Road.—From the first proof line of North Algona, three quarters of a mile in opening a road across lots 5 and 6, concession 8, on the town line of North Algona and Wilberforce.

Addington Road.—The repair of Bar Creek Bridge.

Anson, Minden and Lutterworth.—On West Mountain Lake Road, repairs were made from bridge over Gull River, to concession 9, about seven miles, and a mile chopped out north of the same concession. From lot 17, concession 4, to lot 21, concession 3, two miles were repaired. Again, from Thompson Mill, on concession 4, two miles were graded. On Cameron Road, in Lutterworth, from Miner's Bay, east towards Minden, about four miles were repaired. On North Shore Road, three miles were improved from Sawyers Bridge to boundary of Dysart. On Deep Bay Road, township of Lutterworth, repairs were made from lots 10 to 16, on the 13 and 14 concession line, two miles. From Bobcaygeon Road to lot 5, reaching River Road in Anson, a mile was gravelled. A bridge was covered on Scotch Bush line in Anson, at lot 12, concession 5, and grading done from lot 11, from Brady's Lake, in Hindon. In the same district between lots 10 and 11, Hindon, half a mile was graded, and a bridge built; and on Bobcaygeon Road, repairs were made from lot 6, Anson, to lot 23, for about five miles.

Anstruther Road.—Two miles of cutting, underbrushing and clearing; also the gravelling of half a mile, all on concessions 13, 14 and 15 of Anstruther.

Airy Township Roads.—A continuation of last year's work, and is from lot 5, concession 5, to lot 12. The work is practically new, representing three miles.

Ashdad Station and Mount St. Patrick.—Across lots 28 and 29, concession 11, Bagot, three-quarters of a mile repaired, and four miles, crossing lots 29, concession 10, Bagot, lot 30, concession 11, and over the road generally.

Admaston Bridge.—The completion of work of last year, and on account of which \$350 were paid, and designated, Bomechere River Bridge. Three new piers have been built, and the entire structure so thoroughly repaired as to be safe for many years.

Black Creek Rankin Road.—On concession 22, Wilberforce, crossing lots 20, 21 and 22, a mile opened, and a mile repaired across lots 28 and 29 in the same township.

Bathurst and Althorp Road.—Half a mile of work crossing lots 20, 21 and 22, on the road mentioned.

Badgerow, between Cons. 4 and 5.—A mile and a half of good repairing on the line named and a bridge erected with a span of twenty feet.

Bedford Township Road.—A new road opened from Sydenham and Fermoy road to meet one leading to Richardson's Mine. The length is three miles but the inspector says a further grant is necessary to make a good general highway.

Badgerow, between Concessions 2 and 5 Road.—Three-quarters of a mile opened between lots 8 and 9 in Badgerow.

Burton Road.—Field township—On the above road in Field township three-quarters of a mile opened.

Bromley West Town Line, and Concessions 3 and 16.—On the fifth concession of Bromley a bad hill was gravelled at a cost of about \$100.

Across lots 7, 8 and 9, between concessions 6 and 7, some three-quarters of a mile of gravelling was done, with necessary culverts; while on Osceola road on the third concession across lots nine to twelve many culverts were put in and general repairs made.

Broder and Dill Road.—A mile opened in the first concession of Dill and a mile and a half on the sixth concession of Broder with the construction of a bridge.

Bonfield Township Roads.—On the side line between lots 20 and 21 between concessions 7 to 9, three-quarters of a mile were well improved. A mile was repaired on the four and five side line. Another mile on the 10th concession line across lots 15 to 20, with other improvements of a general character.

Boulter Township Roads.—On the 18th and 19th side line repairs made and on Grand Desert Lake road general improvements were effected.

Bonfield and North Bay Road.—Between concessions 8 and 9 on lots 7 and 8 half a mile of a difficult work, with something like a quarter mile of crosswaying and gravelling.

Bancroft and Coe Hill Road.—Four miles cut out and some crosswaying laid from lot 18, Faraday, to and intersecting the 5th concession, one mile west of the Hastings road, and expected to become the main highway between Bancroft and Coe Hill.

Bancroft and Maynooth Road.—This is the old Hastings Road and was repaired from Herschell boundary to Selby Hill, a length of seven miles.

Belmont Township Roads.—Altogether two miles and a half were improved, partly with a grading machine, but generally gravelling was laid in order to make permanent work.

Burleigh and Apsley Roads.—More than three-quarters of a mile was very permanently repaired to Haultain P. O., covering the length with broken stone from a rock crusher. Two miles were also repaired from Brown's Falls northward.

Buckhorn Road North.—Repairs were made from Rockeroff northward to Cochrane's—ten miles—and from Flynn's Corners westward two miles.

Beaver Creek Road, Kaladar.—About half a mile of new road was opened to avoid hills and securing more practicable grades.

Brougham and Admaston Road.—A hill was cut down known at Mt. St. Patrick on lot 5, concession 12, Brougham, representing about two miles of work.

Brougham and Griffith Road.—Two miles of general repairs on the road leading from Mt. St. Patrick to Griffith township.

Brudenell and South Algona Town Line.—Across lots 3, 4, 5, 6, concession 3, about a mile of work was done.

Calvin Township Road.—On concession 6, between lots 22 and 31, a mile and a half of good work is reported.

Calvin Township, Patterson Creek Bridge.—A bridge built, and about a quarter of a mile of repairs.

Chisholm Township Roads.—On the 5th side line between concessions 6 and 7 three-quarters of a mile was improved. On the 10th line three-quarters of a mile was worked over, between lots 10 to 12 inclusive. Between lots 5 and 6, ninety rods were improved. Three-quarters of a mile opened on line between lots 25 and 26; and between Chisholm and Himsworth through concession 2, half a mile was stumped and graded.

Carden Roads.—On the 9th concession, \$100 spent in general repairs of two miles. One hundred and twenty rods repaired on lot 7, concession 4, and with other work on lots 8 and 9 represents two miles of road.

Chalk River Bridge.—A bridge 125 feet long, with an approach of 150 feet.

Constance Creek Bridge.—In the township of Torbolton, County of Carlton, a bridge 60 feet long was built, in, the inspector says, a workmanlike manner. The approaches to the bridge are about a mile long.

Cache Creek Bridge.—A work let by contract and understood to have been well and thoroughly constructed.

Caldwell, 2 and 3 Concessions Road.—Between the concessions named a quarter of a mile was made and a mile and a quarter repaired.

Caldwell and Badgerow Town Line.—Three-quarters of a mile opened and well graded.

Caldwell, Kirkpatrick, and McPherson Town Line Road.—A mile opened and well graded and another half-mile cut out.

Capreol, 2nd and 3rd Concession.—Corduroying was done under unfavorable circumstances, the timber having to be carried by men owing to the soft character of the ground.

Cosby, between Concessions 3 and 4 Road.—Half a mile opened between concessions 2 and 3, and a mile and a quarter repaired between concessions 3 and 4 with a mile opened, drained and graded, between Martand and Cosby.

Chaffey Locks Road.—From Chaffey Locks towards the boundary between Frontenac and Leeds, repairs were made to within three-quarters of a mile of the said boundary..

Chandos Road.—On Booth's road and Couch road the work was filling and raising the same, making a great improvement.

Cavendish Township Roads.—Upon White Lake road, six miles were turnpiked three being underbrushed and cleared of stone.

Corundum Mine Road.—In the township of Monteaagle the improvements of last year were continued four miles, and generally graded and drained.

Combermere and Maynooth Road.—From the boundary between Hastings and Renfrew, five miles were repaired westward. It is the original Peterson Road.

Clarendon and Mississippi Road.—A work on the old Snow Road and from near Mississippi. A mile opened towards Clarendon Station.

Combermere and Palmer Rapids Road.—Chiefly the work was cutting and ballasting a rough hill, with general repairs over the road between Combermere and Palmer Rapids, a length of about six miles.

District Line Road.—Three miles of work crossing lots 7 to 13 with a long cedar culvert.

Darling, 8th Concession Line.—From lot 3, crossing lots 4, 5, 6, 7, in the 8th concession, the road has been opened. Some twenty-five families are interested in and accommodated by the opening of the highway and which, the inspector says, should be further improved.

Dunnell and Cassimir—Three miles of road opened from lot 1 to lot 8 on the town line, between the said townships.

Douglas Station Road.—One mile, crossing lots 1, 2, 3, and 4 concession 9. Bromley.

Desaulnier Bridge and Field Road.—A mile of road opened, and another half-mile improved, all on the fourth and sixth concessions of the township of Field.

Dunnell Roads.—On the fifth concession from lot 5 west two "gullys" were filled and a bridge of cedar built with stone approaches. On the same concession from lots 9 to 12 a mile and three-quarters were opened with another half-mile from eight to lot nine.

Dalton Road.—A mile and a half of repairs on the Sadowa road from the centre of concession 7 to concession 9, and on Dalton and Washago road from lot 6, Dalton, to Victoria bridge on Victoria Road, about three miles and from the boundary of Carden to Monck Road two miles were improved.

Dysart and Sherborne Roads.—Two miles and a half were repaired in the township of Dysart, on the North-West road. On Harburn road repairs were made from Eagle Lake road to lot 6, concession 1, Harburn, some six miles. From Pine Lake bridge, Guilford township, repairs were made to the boundary of Stanhope for two miles, forming a generally good road; and on Hollow Lake road in Sherborne township a road was opened from lot five to Hollow Lake a mile and half.

Dummer Township Road.—A mile and a half of improvements from lots 15 to 20 in the 9th concession.

Darling and Lanark Boundary.—From lot 1, concession 11, Darling, to the 1st concession of Pakenham, a mile and a half, to open the boundary between the two townships but the inspector says the work is not yet sufficiently completed.

Donegal and Fourth Chute.—A road from Eganville to Fourth Chute on the Bonnechere river from lot 21, concession 18, Grattan, and was a mile of work.

Eldon Three Quarter Line and Dalrymple Road.—On Balsam and Dalrymple road repairs were made from side road in Eldon to lot 4 Carden, about nine miles.

Eganville and Scotch Bush Road.—On the 14th concession of Grattan, across lots 6, 7, 8, three-quarters of a mile of grading and side ditching.

Eganville and Perrault Settlement Road.—From the 11th concession of Grattan, crossing lots 17, 18, 19 eastward, towards Eganville, some two miles of repairs on one of the leading roads.

Field and Badgerow Road.—From Sturgeon River north three-quarters of a mile was opened.

Fourth Lake Road.—From McLean to Enterprise and from Oak Flats Junction north towards Wagerville, some two miles were improved.

Field and Grant.—Three-quarters of a mile on Veuve road was well graded and about a mile cleared and drained on Smoky Falls road.

Field Road on Concession 6.—From Sturgeon River south three-quarters of a mile well graded and another half mile cut out. Another three-quarters of a mile opened and two miles of repairs on the sixth concession.

Ferris Township Roads.—Several works were done in the township of Ferris, among them being on the 10th and 11th concessions between lots 19 to 22, where sixteen acres were worked over. Between lots 14 and 15, concessions 10 and 11, a mile and a quarter improved. On the 8th and 9th concessions, from lots 11 to 14, about a mile of work. Between lots 10 and 11, concessions 6 and 7, the road was, the inspectors says, fairly well done over a difficult portion. From lot 9, concession 8, to lot 20, three-quarters of a mile were well improved, and from Callander in the 6th, and 7th concessions, lots 19 to 20, half a mile.

Faraday and Herschell.—On the town line between the townships named general repairs were made between Haliburton and Hastings for four miles.

Ferry Road.—A work finished, but a detailed report has not yet been received.

Gore Line Road, Indian River and Petewawa Road.—A work in the township of Westmeath consisting of grading and gravelling to the township of Westmeath and Gower Point—also work was done in the township of Fraser and in the township of Alice, crossing lots 10 and 11, in the 11th concession, good work was done, and on the same concession, across lots 3 and 5, repairs were made.

Galway Roads.—A mile and a quarter ditched on "Allan line" and a mile turnpiked on Swamp Lake road, concessions 12 and 13. On the Bobcaygeon road a mile of grading and gravelling and a mile and a quarter across Jackson was improved. Again a mile was repaired on Bobcaygeon road from Kinmount South, and two and a half miles on concession 16 and 17 were improved. On Grange Line from lot A to lot 9, between concessions 10 and 11, two miles were repaired.

Gormanville Road.—A road between concessions 1 and A Widdifield, repaired from lot 22 for a mile and a quarter.

Green Lake Road.—A work on the 24th concession of Wilberforce, across lots 10 and 11, consisting of repairs.

Gibbons 3rd and 4th Concession Road.—A mile and a quarter opened and well graded. Also between concessions 1 and 2, lots 6 and 7, a mile of new road was opened, drained and graded.

Griffin Township Road.—In Addington from the boundary of Renfrew two miles were repaired westward, and thence east to Mattawatchan, three and a half miles, this road is a main highway.

Grattan Township Road.—A work on the town line between Grattan and Sebastopol across lots 35 and 36, half a mile.

Glamorgam and Cardiff Road.—The several works are a deviation about a hill at lots 25 and 26, concession 4, and with other work and repairs represents about three miles of work. At lots 33 and 34 the road was repaired with a deviation of one hundred rods about a hill at lot 35, with cross-

waying. Repairs were also made on Buckhorn road south from lot 22 with many other repairs amounting to about five miles. On the 9th concession, three and a half miles of grading was done, and on Monck road a mile was improved. Two miles were improved on the same Monck road in Dalton and from two miles north of Deer Lake Station in Cardiff to the boundary of Monmouth seven miles were repaired.

Grattan, 15th Concession.—From Perrault Settlement road across lots 17, 18, 19, 20, on the road to Caldwell Station, a mile was well improved.

Gilmour Station Bridge.—A bridge over Beaver Creek to connect the station with St. Ola. Two 37 feet spans with 40 feet approaches of stone filling upon each side, giving a length of 154 feet.

Greenview Bridge.—A bridge over Papineau Creek in the township of Wicklow and renewed entirely.

Hugel and Badgerow Road.—Four miles of work, including the grading of three difficult hills.

Hammer Township Roads.—One mile of road was opened between concessions 3 and 4 and two miles repaired.

Hurtubise Road.—Beginning at lot 8, con. 7, and ending at lot 9, Ferris township, half a mile was well done as reported.

Hugel, Between Concessions 2 and 3.—Half a mile of road opened through a swamp and three-quarters of a mile on the same concession line.

Herschell, 3rd Concession.—Grading and draining from Faraday and Herschell road to the I. B. and O. Railway, a length of three miles.

Hermine and Bancroft.—The reduction of a hill on lots 8 and 9, con. 12, in Dungannon township, cutting five feet deep and making a great improvement.

Harlowe and Myers Cave Road.—Necessary repairs upon hills which were washed out.

Harvey Township Road North.—General work on Bobcaygeon to Buckhorn road, and on Nogey's Creek and other roads, representing at least five miles of substantial improvements.

Harvey Township Road South.—From Lakehurst two miles were underbrushed and a mile graded and gravelled. Also on North Lakehurst road two miles were graded and gravelled, the latter being done in conjunction with the municipality.

Hagarty Township Roads.—Two miles and a half on the 2nd concession across lots 10 to 12 and beyond. Between lots 30 and 31, about half a mile of cutting and grading to improve a heavy hill, and across lot 35 Hagarty, and lot 1 Sherwood, half a mile was repaired.

Hydes' Chute—Griffith Township.—Two miles were well improved across lots 13 to 30, Griffith, and a cedar bridge built over Goddin's Creek, with other repairs at lot 36 of the same township.

Harryette's Corners and Brudenell Road.—General repairs on Peterson road.

Hungerford Road.—A bridge erected over Claire river in Hungerford fifty-seven feet long, and situate on lot 24 in the 8th concession.

Jennings and Appleby Town Line.—Two miles opened from lot 7 to lot 13 on the line mentioned.

Jennings 5 and 6 Concessions.—A mile and a half of road opened and graded and a 40 feet bridge erected.

Jones Falls and Battersea Road.—From Chaffey Locks towards boundary between Frontenac and Leeds, repairs were made to within three-quarters of a mile of the said boundary.

Kirkpatrick, Concessions 4 and 5.—A mile and three-quarters opened on the road as above, with a small bridge and approaches.

Killalloe and Brudenell Road.—The main road from Killalloe on the railway to Brudenell in Rockingham, more than a mile of good work.

Lake Clear Road.—In the township of Sebastopol, a mile of repairs were made.

L'Amable and Fort Stewart Road.—A continuation of last year's work for a further length of three miles.

L'Amable and Bancroft Road.—A new road on the south branch of York Branch river. It is a portion of the Hastings road south of the Village of Bancroft and the work a mile and a quarter.

Long Lake Road.—Is a portion of the original Snow road in the township of Mayo, the work being from three miles east of Herman P. O. eastward a mile and a half.

Martland Road.—Half a mile opened and a quarter of a mile of drainage.

Mattawan Township Roads.—On concessions 9 and 10 across lots 40 to 44, a mile of work. On concessions 7 to 10 crossing lots 32 to 33, two miles of excellent repairs were made, and on concessions 5 and 6, between lots 30 and 31, a mile and a quarter was improved, totalling four and a half miles.

Mickle Steeps.—Half a mile opened between lots 2 and 3 in con. A, Caldwell, drained and graded.

Mason, Cosby and Delaware Boundary to C. P. Railway.—From lot 1 to lot 5 two miles were opened, and from lots 5 to 9 another two miles were opened, graded and drained.

Moore's Bridge and Road.—The renewal of a bridge over York Branch river in the township of Herschell which had a span of 50 feet and two of 30 feet, the full length being one hundred and sixteen feet.

Morrison and Rama Town Line.—Repairs from the boundary of N. Orillia to Cooper's Falls, about four miles, gravelling where most necessary, making now, the inspector says, a good road.

Monck, Between Rama and Rathburn.—Between the points mentioned four miles of good road have been made with stone and gravel.

Methuen Township Roads.—Four miles of grading and ditching from Oak Lake northward.

Monmouth Roads.—From lot 21, con. 3, two miles were repaired. Repairs were made on Monck road from Hotspur east for four miles, and a bridge was built over burnt River seventy-eight feet long.

Maynooth and Madawaska Road.—A continuation of last year's work and repairing and improving many portions. A mile and a half was also cut out as a further opening of the highway.

McPherson Township, 5 and 6 Concession.—Three-quarters of a mile opened, with half a mile of ditching.

McLean and California Road.—The repair of a road along the north shore of Fifth Depot Lake.

McPherson and Kirkpatrick Town Line.—Two bridges, each with a 22 feet span built upon cribs of square timber filled with stone and with good approaches.

Nosbonsing Station Road in Ferris.—On the 6th concession of Ferris across lots 3 and 4, half a mile of good work was done.

North Sherbrooke, 3rd Concession.—Two miles of work crossing lots 6, 7, 8 and 9.

Ncelon Road, Between 3rd and 4th Concessions.—Two miles well improved.

Opinicon and South Cosby Roads.—General repairs.

Oak Flats Road, Addington.—A road to the Village of Picadilly, a mile of which was opened from the old road to the boundary between Portland and Hinchinbrooke.

Olden Township Road.—A mile and a half of gravelling.

Papineau Township Roads.—On con. 12, between lots 6 and 8, three-quarters of a mile; on con. 10, between lots 30 and 31, an equal length, and on con. 8 across lots 10 and 11 another three-quarters. Two miles and a quarter altogether.

Price's Hill Road.—In Horton township crossing lots 23 and 24 of the 7th concession, the road was generally improved.

Pembroke and Mattawa Road and Bridge.—In the township of Buchanan across lots 10 to 13 a mile was improved, and from lot 30, Papineau, to lot 11, Clara, fifteen miles were repaired. A mile and a quarter in the township of Rolph was also improved, a bridge built over Deux River with a mile repaired in Head township.

Petewawa Road.—Half a mile of work on the 4th concession crossing lots 5 and 6.

Plevna, Ardoch and Clarendon Roads.—From near the Village of Ardoch towards Clarendon Station, about eight miles of very satisfactory repairs were made.

Purdy Mill Road.—General repairs.

Perth Road to Loughboro' Lake.—The road has been levelled and somewhat improved, but not being able to get a stone crusher, the completion of work was postponed till later.

Pogue Lake Road, Sherwood.—Two miles opened leading to Barry's Bay, crossing lot 179, range B, in the township of Sherwood.

Quadrille and Vanburg.—Some general work on the road mentioned.

Rolph, Lots 18 and 19.—General repairs on the 5th concession for half a mile.

Rama, Con. L., Road.—Work opposite lots 11 to 14, and 3 to 6 in the township of Rama.

Ratter Township Road.—On the Warren and Deer Lake a 30 foot span bridge was built over Deer Creek upon cedar cribs filled with stone, and a bad hill was cut down to very materially improve the road.

Railton Road, Loughboro' Township.—Half a mile turnpiked 16 feet wide on the Sydenham and Kingston road towards Railton, and upon the same road another mile was repaired and drained.

Ramsay Road.—From concession 4 to concession 8, Ramsay, a road was made between lots 15 and 16 for about two and a half miles.

Rockingham and Palmer Rapids Road.—Beginning at the road from Rockingham to Combermere and thence towards Palmer Rapids a mile and a quarter was satisfactorily opened.

Roches Fondu Road.—In the township of Westmeath, crossing east front of concession B. and lots 20 and 21, half a mile of good work was done.

South and North Algona Roads.—On the 3rd concession of South Algona across lots 12 to 15, inclusive, satisfactory improvements were made, opening the line to Eganville and Killaloe road; and on the 6th concession three-quarters of a mile across lots 9, 10 and 11 were opened.

Springer Township Roads.—A mile graded and well drained between concessions B. and C. Another mile was opened and graded, and on concession C., lots 8 and 9, a mile of ditch was opened, and a mile and a half of repairs with drainage on the 3rd concession.

Sudbury and Blezard Valley Road.—The grant of \$2,000 was spent upon a long section of this road, and according to the accounts good work was effected, six miles are understood to have been well improved for general traffic.

Stanhope and Snowdon.—About sixteen miles of work in the improvement of eight portions in the above townships and fully described in the inspector's reports.

Stoqua Road.—A mile of grading and gravelling from lot 18 north Front A., crossing into lot 19, Westmeath.

Somerville, Laxton and Bezley Roads.—Cameron road, graded last year, was gravelled over a mile. In Somerville three miles and a half were graded and gravelled, assisted by the municipality to the amount of \$200. In the same township of Somerville between concessions 6 and 7, and at lots 6 and 7, known as "Burnt River Road," a mile of stone filling and other work, representing a mile.

Stafford Proof Line.—From lot 6, con. 4, crossing lot 6 in con. 4, and the same lot in con. 3, about two miles of work were done.

Stage Road, Wolfe Island.—The necessary work was, the inspector says, well done.

Shamrock D'Acre Road.—On the Opeongo road two miles were improved from "McMahon's hill" crossing lots 10 to 13, inclusive.

Sebastopol Township Road.—On the 14th concession across lots 8 and 9 a mile and a half of good repairs were effected.

Sheffield and Hungerford Road.—A road was opened for the convenience of Tweed, Marlbank and Tamworth settlers, and, making a short cut of a mile and a half saves, the inspector says, about eight miles.

Strathway and Palmer Rapids Road.—A good work was done in improving the 14th concession of Raglan across lots 31 to 34, inclusive.

Sebastopol, 7th Concession.—Work was done crossing lots 1, 2, 3 in A., about a mile.

Victoria Road.—North of Uphill to con. 6. Digby, a ditch was opened, and the swamp at concessions 4 and 5 gravelled, representing some six miles of repairs. South of Uphill five miles were repaired.

Vennachar and Mallory Hill.—On the main road between Plevna and Denbigh, three miles of improvements were made towards Vennachar.

Wahnipitae and Sudbury Road.—A bridge built over Burr Creek with a 30 feet span upon cribs filled with stone. Three miles were also repaired.

Westport Bridges, Moberley.—The construction of a bridge over a dam at Fredericksburg's Mill at estimated cost of \$1,500. The Government gave \$900 towards its value.

Wilberforce Concession Lines.—On the 24th concession across lots 10 and 11: on the 18th concession over lots 27 to 29, inclusive, and on the 12th concession, lots 10 to 13, inclusive, work was done amounting to about two and a half miles.

Warren and Monneterville Road.—Between Jennings and Casimir three-quarters of a mile opened, graded and drained. On Martland and Cosby boundary a mile was similarly opened, and in Appleby between concessions 1 and 2 a mile and a quarter was well opened.

Whitefish Lake Road, and West Mountain Road.—In the township of Brougham towards the Village of D'Acre from lots 13 to 16 and across lots 5 to 8, inclusive, in the 14th concession with other work, several miles of improvements were made.

Warren and Markstay Road.—A quarter of a mile of crosswaying through a bad swamp, and a mile and a half of road opened, graded and drained.

Waito Station Road, Concession 12, Wylie.—On con. 12 a road opened between lots 5 and 6 for about a mile and a quarter. A mile was opened crossing 12 and 13, and from Bonnechere road to con. 4, N. Algona, across lots 6 to 9, inclusive, another mile opened.

Westmeath, 3rd Concession Road.—A mile and a half between lots 10 and 11, lots 7 and 8 and elsewhere of grading and gravelling.

Widdifield Township Roads.—On con. 5 between lots 10 to 14, a mile and a half of repairs, and on North Bay and Trout Lake road a mile of excellent work was done. On Widdifield Station road from lot 5, half a mile of improvements, with two miles from lot 20, con. A., to lot 20, con. 1, all in Widdifield.

Washago Road, East, into Rama.—Three miles of repairs from the first concession of Rama to lot 5, dating from the boundary.

White Lake Road.—On the 6th concession and crossing lot 26 into the 7th concession of Pakenham, two miles were repaired.

Wylie Township Road.—The opening of the 12th concession between lots 5 and 6, half a mile.

Wilberforce Roads.—On concession 22 across lots 35 and 36 good work was done, and on the town line between N. Algona and Wilberforce, about a mile and a half was graded.

TEMISCAMING DIVISION.

Armstrong and Hilliard Road.—A contract was given for the construction of two miles and a half on the line between lots 2 and 3, Hilliard, across the 4th concession and thence east towards White River. Four miles of stumping and grading from Earlton from lot 3, and on the same road two miles were double ditched and a mile and three-quarters stumped and graded, making three miles of good road.

Armstrong and Beauchamp Road.—From Earlton west between concessions 3 and 4 and crossing lot 4 in Beauchamp, five miles of work were done, three of which were substantially improved over very heavy hills, involving the construction of three bridges. The two miles in Beauchamp

being wet and swampy is not yet substantial, but a quarter of a mile of crosswaying was laid with stumping, ditching and off-take drains.

Brethour Road.—Eight miles of work on the side line between lots 6 and 7 of the township of Brethour, and two miles opened.

Beauchamp Road.—A contract for the construction of six miles at \$500 per mile. Work began at front of con. 5, Beauchamp, between lots 4 and 5, going north one mile, thence west on con. 6 to where a deviation was made northward to avoid a rocky ledge, and then westward to lot 7, where another deviation was necessary southward to lot 10, when the line was again reached and continued to Spring Lake for the length specified in the contract.

Casey, between Lots 2 and 3.—The opening of a road into "Robert Settlement" from "Sheedy" road.

Dack Township Bridges.—On lot 5, con. 8, a bridge was constructed over White River at a contract price of \$475.00, and reported as satisfactory in all respects. A mile and three-quarters of road was also opened.

Evanturel, between Lots 6 and 7 Road.—From the 3rd and 4th concessions between lots 6 and 7, three miles were graded and ditched upon each side. Eleven culverts were constructed, with one hundred rods of crosswaying.

Evanturel and Marter Boundary.—A mile and three-quarters graded on the town line named, and some ten or more miles repaired.

Firstbrook, Concession 5 Road.—Three miles opened on the fifth concession of the above township westward. The work consisted of 135 rods of crosswaying with a ditch upon each side, and 16 culverts. A bridge was built over Spring Creek 60 feet long upon substantial abutments, with two miles of grading.

Grading Old Roads, Temiscaming.—From Liskeard to con. 4, Harley, four miles were graded. Again from Liskeard eastward into the township of Harris, another four miles. From Liskeard to Haileybury, about six miles were improved. Also from the same point to the town line of Armstrong, about twenty-three miles were more or less improved. On the 6th concession of Hudson one mile, and on the town line of Harley and Dymond from "North Road" west, four miles, with another half mile north, aggregating thirty-seven and a half miles well repaired and improved.

Henwood, 4th and 5th Concession.—A contract for three miles at \$450 per mile was made, and the work well performed in opening a road between concessions 4 and 5 from lot 6, to the east boundary of Cane. Two miles were also graded and double ditched on the same concession line, and gravelled throughout.

Haileybury and Cobalt Road.—For the comparatively small sum appropriated a mile and a half of excellent work was done. The road is the highway from Cobalt to Haileybury and is not yet in condition for general use and a further expenditure might be considered with the question of cost to open a good road.

Harris Roads.—Three miles were let by contract between lots 2 and 3 from front of con. 3 to front of con. 5 at \$165 per mile. Three miles from the same side line in the front of the 6th concession to White River at \$325 per mile, and two miles on the line between lots 6 and 7 from the front of con. 6, Harris, to the front of con. 2, Casey. In addition to the above contracts, many repairs were made in the 2nd concession and elsewhere.

Harley and Hilliard, Thorneloe East.—Beginning at the west end of the above road three-quarters of a mile was ditched and turnpiked and includes the cutting down of three large hills, with a culvert 40 feet long. Another half mile of stumping, grubbing and ditching.

Heaslip and Charlton Road.—Full returns have not been received.

Hudson Roads.—Two miles opened and one mile graded.

Haileybury and Firstbrook Road.—Four miles of repairs were made and the road well improved.

Hilliard Road.—Between concessions 4 and 5 from south boundary of the township north, three miles were opened.

Kearns and Armstrong Town Line.—Two miles of work with drainage upon each side.

Robillard Concession 4 Road.—A mile was opened between concessions 4 and 5, 60 feet wide, grubbed and stumped over 30 feet of the centre of the road. Half a mile was opened similarly across lot 2, and another half mile on lot 9. Four miles altogether.

Repairing Old Roads.—Some twelve miles of repairs were made in the vicinity of New Liskeard towards Harley and on the road to Haileybury, and on the 4th concession of Hudson.

Savard and Marquis Boundary.—A length of three miles were opened from lot 5 to lot 11.

Sheedy, Taylor and Windigo Road.—Across lot 5, con. 6, Craig, to the north half of lot 2, con. 1, Brethour, nearly two miles were opened.

SUMMARY OF EXPENDITURE ON COLONIZATION ROADS AND BRIDGES
IN THE YEAR 1906.

Name of Work	Expenditure
North Division.	
Aubrey Township Road	\$699 53
Awere Township Road	299 64
Bass Lake Road, Aberdeen, Concession 4	301 35
Bruce Mines and Sault Road	508 41
Blind River and Algoma Road	405 37
Bright Township, Rogers and Iron Bridge	504 06
Bright Township, Concession 4 Road	299 81
Bar River Bridge and Road	200 09
Barclay and Wabigoon Road	500 00
Burpee and Cockburn Island, First Section	361 20
Burpee and Cockburn Island, Second Section	349 22
Barrie Island and Mills Road, First Section	350 00
Barrie Island and Mills Road, Second Section	352 79
Burris Township 8 and 9 Road	1,003 52
Blue, Pratt and McCrosson Road	1,003 76
Bellevue Road	481 29
Clarks Bridge Road	202 91
Coffin Township, Fraser's School Road	302 00
Chapleau Township Road	371 05
Centre Line Road, Bruce Mines	401 62
Campbell Township No. 1	124 98
Campbell Township No. 2	225 37
Campbell Township No. 3	101 12
Campbell Township No. 4	250 05
Creighton Road	300 00
Conmee Township, Concession 1	680 00
Conmee Township, Concession A and 1	480 00
Carpenter and Kingsford Road	1,000 00
Dean Lake and Blind River Road	254 45
Dean Lake Mine Road	400 00
Day Township, Concession 2 Road	200 57
Dinorwic and Sandy Lake Road	250 00
Dryden Road North	200 00
Drury, Denison and Graham Road	500 00
Dorion Township, Road and Bridge	775 15
Dilke Township 33 and 34	465 60
Dobie Township Road	500 00
Eton Township Road	501 61
Espanola Road	596 08
Fossill Hill Road	400 00
Gordon Lake Road	200 00
Galbraith Township Road	299 21
Gordon Lake and Sault Road	199 16
Gamble and Graham Mill Road	300 00
Gore Bay and Providence Bay Road	599 48
Grimesthorpe Road	299 70
Gordon, Allan and Billings Roads No. 1	589 99
Gordon, Allan and Billings Roads No. 2	200 00
Gordon and Allan Road (Conditional)	500 00
Gillies, Scoble and Pearson Road	502 26
Goulais Bay Road	1,999 71
Hilton Township I to K Line	304 03
Hilton Township Road	400 88
Hermina Mine Road	489 49
Honora and Little Current Road	500 75
Howland and Bidwell Road No. 1	500 00
Howland and Bidwell Road No. 2	200 00

SUMMARY OF EXPENDITURE ON COLONIZATION ROADS AND BRIDGES
IN THE YEAR 1906.—*Continued.*

Name of Work	Expenditure
<i>North Division.—Continued.</i>	
Haviland and Fenwick Road	\$299 00
Isbester Road	299 95
Johnson and Plummer, Cariboo Lake Road	400 57
Johnson Township, Hincks' Location Road	400 00
Jocelyn West Boundary Road	299 98
Johnston Township, Concession 3 Road	313 04
Kagawong and Gore Bay Road	604 63
Korah Road	500 47
Lumsden Township Road	515 25
Lefroy 2nd Side Line Road	295 14
Lavallee and Burris Road	991 25
Lybster and Marks Road, Post 34	498 75
McLennan Road in Laird	299 69
McLennan and Bar River Road	399 60
McDonald, Meredith and Aberdeen Road	296 50
Morrison Corners and Rose Township Road	200 18
Massey Township from Salter and May	500 48
Mellick and Jaffray Road	1,797 75
Meldrum Bay and Silver Water Road	587 23
Miscampbell Road	504 17
McIntyre Township Road	900 15
Morley, Sections 8 and 17 Road	597 33
Morley and Pattullo Road	977 10
Mather and Dobie Town Line Road	1,012 04
Michipicoten Road	991 16
Nairn and Lorne Township Roads	800 00
Nellis 4th and 5th Road	990 90
Oliver and McIntyre Town Line Road	301 75
O'Connor Township Road	782 50
Plummer and Aberdeen Concession 2 Road	1,526 37
Port Finlay and McLennan Road	200 54
Port Finlay and Echo Bay Road	250 00
Parkinson Township Road	299 43
Plummer, John and Aberdeen Road	302 22
Patton Township 4 and 5 Road	300 25
Patterson Hill Road	152 26
Providence Bay Road	606 69
Pattullo Township South Road	962 21
Parke Township Road	299 87
Prince Township Road	499 54
Pennefather Township Roads	400 98
Rayside Road	494 60
Rat Portage Road	248 24
Rockville and Lehmans Road	404 94
Rainy River Road (Atwood)	331 83
Sylvan Valley Road	399 50
Salter and Victoria Town Line Road	411 30
St. Joseph Township 5 and 6	295 88
St. Joseph Township U to A	305 55
Striker Township 3 and 4	500 97
Sanford Township Road	500 00
Stanley Bridge Road East	700 58
Stanley Bridge Road West	300 98
Slate River Bridge	150 00
Sandfield and Tehkummah Road, First Section	293 59
Sandfield and Tehkummah Road, Second Section	300 00
Sturgeon Creek Bridge, Shenstone	183 87

SUMMARY OF EXPENDITURE ON COLONIZATION ROADS AND BRIDGES
IN THE YEAR 1906.—*Continued.*

Name of Work	Expenditure
<i>North Division.—Concluded.</i>	
Silver Mountain 36 Mile Post Road	\$206 50
Silver Mountain Road, Lybster	304 38
Tenby Bay Road, Joselyn	300 00
Thessalon River Bridge, near Gordon Lake	250 00
Thessalon River Bridge, above Rock Lake	254 95
Tait Township Road	999 37
Tait and Mather Town Line	995 00
Tarentorus Township Road	498 49
Vermillion Bay Road	300 16
Van Horne Road	599 10
Wabigoon Road	600 00
Walters Township Road	595 44
Wainwright Township Roads	499 98
West Bay and Slash Roads, First Section	250 00
West Bay and Slash Roads, Second Section	252 27
Whitefish Bridge, O'Connor	255 40
Balfour Township Road, Balance 1905	50 32
Oliver Township Roads, Balance 1905	33 99
McIntyre and Neebing Road, Balance 1905	4 00
Van Horne Road, Balance 1905	153 00
Gillies Road, Balance 1905	6 50
Stanley and Fort William Road, Balance 1904	1,208 16
Inspection, Balance 1905	82 33
Inspection	3,770 37
	\$66,435 72
<i>West Division.</i>	
Brandy Creek Road, Gibson	\$201 15
Brandy Creek Road, Port Carling-Sandfield	298 31
Brandy Creek Road and Bridge, Approaches	400 00
Broadbent and Eglington Road	300 00
Bear Lake and Nipissing Road	300 00
Bethune 5th Side Line Road	199 99
Bethune Bridge	159 50
Balkwell Road	404 00
Booth Road	900 04
Chaffey and Franklin, Cardwell	200 00
Chaffer Road North from Huntsville	199 86
Chaffey, Franklin and Birkindale	296 88
Christie and McKellar Road	300 33
Carling Township North West Road	303 52
Croft Bridge, Lot 20, Concession 3	359 40
Croft Township 30 and 31	200 00
Commanda Lake and Restoul Lake Road	201 29
Distress River Road, Strong and Chapham	199 99
Dunchurch and James Bay Road	1,016 59
Dalton and Washago Road	302 14
Edgington and Humphrey Road	299 80
French River Road	1,100 00
Golden Valley Road	200 00
Humphrey Township Road and Bridge	254 20
Jarlsburg Road	200 00
Kill Bear Point Road	200 00
Little Pickerel River Road	155 73
Laurier Township 9 and 10	199 56
Lerrimer Lake Road, Ferguson	400 87

SUMMARY OF EXPENDITURE ON COLONIZATION ROADS AND BRIDGES
IN THE YEAR 1906.—*Continued.*

Name of Work	Expenditure
<i>West Division.—Concluded.</i>	
Little Doe Lake Road	\$202 01
Muskoka Township Road, Lot 3, Concession 10	405 26
Muskoka Road, Morrison Township	396 00
Medora, Wood-Baxter Road	300 00
Medora-Wood Township Road	202 01
Medora-Wood-Kilworthy Road	104 10
Macaulay and Brunel-Huntsville and Baysville	202 42
Macaulay-Jackson Hill Road	400 00
Macaulay-Morrison's Corners Road	200 17
McLean, Ridout, Franklin and Sinclair Road	200 60
McLean, Ridout, Old Dorset Baysville Road	200 00
McLean, Ridout, Baysville Westerly Road	200 00
Machar and Lount Townships, First Section	200 00
Machar and Lount Townships, Second Section	200 00
Machar and Lount Townships, Third Section	400 00
Monteith Township, 5th Side Line	200 98
Maple Lake Station Road	200 00
McMurrich 25th Side Line Road	201 75
Muskoka Road, North of Ardtrea	389 67
McDonald and Leatherdale Road	303 15
Matchedash Roads	594 13
Nipissing Road, Rye and Commanda	196 38
North Grand Road	300 00
North Himsworth 5th Side Road	300 12
Nipissing and Powassan Road	200 80
Oakley and Draper Town Line Road	399 99
Oakley and Draper Road Easterly	199 56
Oakley, Draper and Ryde, Housey's Rapids	300 13
Perry 15th and 16th Side Road	300 24
Port Severn Road	300 00
Ryerson and Spence Road	200 41
Stisted and Cardwell, Old Stisted Road	409 06
Stisted-South Cardwell Road	300 71
Stisted-North Cardwell Road	100 00
Stephenson-Muskoka Road	400 46
Stephenson and Watt-Parry Sound Road	299 88
Spence Township, 21st Side Road	302 50
Trout Creek and Glen Roberts Road	200 25
Westphalia Road	199 99
Westphalia Road, Trout Creek	300 08
Inspection	1,324 67
	\$21,991 24
<i>East Division.</i>	
Addington Road	\$294 25
Airy Township Road	300 00
Algona South, proving line 5th and 6th Road	296 65
Algona South, Sebastopol Road	112 00
Algona South, 6th Concession	200 35
Algona Proof Line, Concession 7	200 00
Alice and Fraser Town Line Road	110 40
Alice 10th Concession Road	305 00
Alice 12th Concession Road	202 61
Alice B Line Road	200 00
Algona North 8th Line Road	286 95
Ashdad and Mt. St. Patrick Road, First Section	613 50

SUMMARY OF EXPENDITURE ON COLONIZATION ROADS AND BRIDGES
IN THE YEAR 1906.—*Continued.*

Name of Work	Expenditure
<i>East Division.—Continued.</i>	
Ashdad and Mt. St. Patrick Road, Second Section	\$226 25
Admaston Bridge	180 44
Anstruther Road	202 75
Ansen, Minden and Lutterworth, Bobcaygeon and Brody's Lake Road...	521 30
Ansen, Minden and Lutterworth Deep Bay Road	100 12
Ansen, Minden and Lutterworth Mountain Lake Road	349 12
Ansen, Minden and Lutterworth Bobcaygeon Road to Lutterworth	308 49
Ansen, Minden and Lutterworth Thompson's Mill to 4th Concession	100 00
Ansen, Minden and Lutterworth Minden and Allsaw Road	99 37
Ansen, Minden and Lutterworth Cameron Road from Minden Bay	156 00
Ansen, Minden and Lutterworth North Shore Road to Dysart	100 66
Beaver Creek Road, Kaladar	200 00
Bedford Road	199 00
Bedford Township Roads	304 23
Bancroft and Cee Hill Road	536 71
Bancroft and Maynooth Road	301 12
Bonfield Concession 5 Side Road	150 07
Bonfield Side Line, Concessions 8 and 7	199 98
Bonfield, Lot 10 and 12	274 40
Bonfield, Concession 10	312 86
Bonfield, South Shore Road	301 12
Bonfield and North Bay Road	305 14
Bonfield and North Bay Road, Lot 3, Concession 9	100 00
Boulter, Grand Desert Road	349 58
Boulter Side Line 18 and 19	301 06
Bathurst and Althorpe	248 75
Bromley West Town Line Road	302 16
Bromley 3rd Line Road	100 50
Bromley District Line Road	250 00
Bromley Proof Line 6 and 7	300 00
Bromley 20th Concession Road	150 18
Brougham and Admaston Road	200 10
Bagot 11th Concession Road, First Section	462 25
Bagot 11th Concession Road, Second Section	206 50
Brougham and Griffith Road	196 75
Brudenell and South Algona	252 00
Buckhorn Road North	401 07
Badgerow 4th and 5th Road	391 12
Badgerow 2nd and 5th Road	411 93
Burton Road, Field	303 10
Broder and Dill Road, First Section	398 85
Broder and Dill Road, Second Section	309 95
Broder Township, Kelly Lake	180 00
Black Creek and Rankin Road	155 13
Bromley Line Road	297 00
Bromley-Des Joachim and Moore Lake Road	200 00
Bromley-Des Joachim and Mackay Station Road	157 00
Belmont Township Roads, First Section	317 61
Belmont Township Roads, Second Section	204 96
Burleigh and Apsley Road	596 80
Chalk River Bridge	458 20
Clarendon and Mississippi Road	300 00
Corundum Mine Road	498 80
Combermere and Maynooth Road	295 02
Constance Creek Bridge	698 80
Calvin Township Road	300 30
Chisholm Township, Lot 24 and 25	300 25

SUMMARY OF EXPENDITURE ON COLONIZATION ROADS AND BRIDGES
IN THE YEAR 1906.—*Continued.*

Name of Work	Expenditure
<i>East Division.—Continued.</i>	
Chisholm Township, Concession 9 and 10, Lots 23 and 16	\$251 30
Chisholm Township, Concession 5 and 6, Lot 10	251 75
Chisholm Township, Concession 8 and 4, Lot 5	250 65
Chisholm Township, Concession 9, Lot 5	250 00
Chisholm Township, Concessions 2 and 4, boundary line Chisholm and Himsworth	199 00
Calvin Township Patterson Creek Bridge	299 90
Cache Creek Bridge	500 00
Caldwell 2 and 3 Road	310 49
Caldwell and Badgerow Town Line	200 00
Caldwell, Kirkpatrick McPherson Road	396 10
Capreol 2nd and 3rd Road	401 26
Cosby Concession 3 and 4 Road	200 38
Cosby 2 and 3 Road	204 80
Cosby and Martland Road	400 72
Corkhill Road, Loboro	201 73
Combermere and Palmer Rapids Road, First Section	476 47
Combermere and Palmer Rapids Road, Second Section	292 44
Cavendish Roads	399 80
Chaffey Locks Road	205 42
Constance Creek Bridge	698 80
Chandos Road	202 48
Carden Roads, 8th Concession from Lot 5	199 92
Carden Roads, Dalrymple to Balsoor	199 66
Carden Roads, 1st Quarter Line on the 9th	100 00
Darling 8th Con. Line Road	299 59
Darling and Lanark Boundary Road	199 98
Dunnett and Cassimer Road	398 99
Desaulier Bridge and Field Road	416 20
Dunnett 8 and 9 Con. 5 Road, First Section	301 65
Dunnett 8 and 9 Con. 5 Road, Second Section	80 00
Dunnett 8 and 9 Con. 5 Road, Third Section	400 95
Douglas Station Road	300 00
Donegal and Fourth Chute	194 81
Dummer Township Road	199 86
Dysart and Sherbourne Roads, Harburn and Eagle Lake	180 32
Dysart and Sherbourne North West Road	103 25
Dysart and Sherbourne Maple Lake and Pine Lake Road	150 50
Dysart and Sherbourne Hollow Lake Road from Lot 5	334 81
Daïton Roads, Black River Road	100 00
Dalton Roads, Sardowa Road	100 37
Dalton Roads, Dalrymple Road South	100 00
Dalton Roads, Monek Road	200 00
Eganville and Scotch Bush Road	302 00
Eganville and Perrault Road	300 45
Eldon Roads, 3rd Quarter Line, 4th and 6th Cons.	120 00
Eldon Roads, Balsoor and Dalrymple Road	149 87
Fourth Lake Road	202 07
Faraday and Herschell Road	100 25
Field Road No. 1	302 50
Field Road No. 2	203 93
Ferris Township, Concessions 10 and 11 Road	200 00
Ferris Township, Concessions 6 and 7 Road	300 00
Ferris Township, Concession 6 Road	152 65
Ferris and Chisholm Road	200 71
Ferries, Corbeilles and Nipissing Road	334 61
Ferries, Corbeilles and Trout Lake	150 00

SUMMARY OF EXPENDITURE ON COLONIZATION ROADS AND BRIDGES
IN THE YEAR 1906.—*Continued.*

Name of Work	Expenditure
East Division.— <i>Continued.</i>	
Ferris, Concessions 8 and 9	\$200 00
Field and Badgerow from Sturgeon River	251 45
Field and Grant Road	412 85
Field Road, Concession 6	201 37
Ferry Road, Howe Island	200 00
Griffin Township Road	500 04
Greenview Bridge, Papineau Creek	288 26
Gilmour Station Bridge	500 00
Gormanville Road, Widdifield	202 40
Gibbons 3 and 4 Road	400 00
Gibbons 1 and 2	499 18
Golden Lake Road	200 00
Gore Line 4th Concession Road, Petewawa	151 75
Gore Line, Indian River Road	102 03
Gore Line Road	250 00
Gore Line-Town Line Road	150 00
Gore Line, 22nd Concession Road	200 00
Gratton Township Road	224 30
Gratton 13th Concession Road	200 75
Galway Roads, First Section	500 50
Galway Roads, Second Section	300 75
Glamorgan and Cardiff, Lot 25, Concession 4, Glamorgan	100 00
Glamorgan and Cardiff, Buckhorn Road, Gooderham	175 00
Glamorgan and Cardiff, Monck Road, Irondale	336 90
Glamorgan and Cardiff, Monck Road East of Glamorgan	90 00
Glamorgan and Cardiff, Deer Lake to Wilberforce	600 07
Glamorgan and Cardiff, Hollow Lake Bridge	98 05
Grading machinery	496 00
Harlow and Myers Cave Road	199 91
Harrowsmith and Sydenham Road	250 00
Herschell 3rd Concession Road	300 00
Hermina and Baucroft Road	199 95
Hungerford Township Road	302 46
Hugel and Badgerow Road	499 40
Hanmer Township, First Section	453 75
Hanmer Township, Second Section	150 50
Hugel, 2nd and 3rd Concession Road	199 95
Hugel, 4th and 5th Concession Road	201 35
Hurtibise Road	300 80
Hagarty Township, First Section	400 00
Hagarty Township, Second Section	300 48
Hagarty Township, Third Section	100 00
Hyde Chute and Griffith Road, First Section	406 53
Hyde, Chute and Griffith Road, Second Section	101 05
Harryettes Corners and Brudenell Road	199 35
Harvey Road North	491 62
Harvey Road South	298 88
Jones Falls and Storrington Road	355 42
Jones Falls and Morton Road	151 21
Jennings and Appleby Town Line Road	398 12
Jennings 5th and 6th Road	503 50
Kirkpatrick 4th and 5th Road	200 11
Kirkpatrick 8 and 9	200 00
Killaloe and Brudenell Road	494 70
L'Amable and Ft. Stewart Road	589 47
L'Amable and Bancroft Road	400 00

SUMMARY OF EXPENDITURE ON COLONIZATION ROADS AND BRIDGES
IN THE YEAR 1906.—*Continued.*

Name of Work	Expenditure
<i>East Division.—Continued.</i>	
Long Lake Road	\$231 62
Lake Clear Road	196 20
McLean and California Road	200 00
Maynooth and Madawaska Road	388 76
Moore's Bridge	300 10
Morrison and Rama Town Line Road	500 00
Monck Road, Rama and Rathbun	499 60
Mattawan Township Roads, Con. 3, Lot 40 Road	250 15
Mattawan Township Roads, Con. 3	150 38
Mattawan Township Roads, Concession 3 Bridge	97 70
Martland Road 2 and 3	200 40
Mickle Steeps Roads, Lot 2 and 3. Caldwell	196 25
Mason and Cosby Road	400 00
Mason and Delaware Road	399 30
McPherson and Kirkpatrick	403 76
McPherson Town Line Road	300 17
Methuen Township Road	310 18
Monmouth South Road, 17 and 23 Concession	500 10
Monmouth Hotspur and Tory Hill Road	299 29
North Sherbrooke, Concession 3	300 00
Nosbonsing Station Road, Ferris	200 75
Neelon Road	250 00
Olden Township Road	200 34
Oak Flats Road	200 44
Opinicon Lake South Crosby Road	206 15
Plevna Arden and Clarendon Roads	750 00
Perth Road, Loboro	183 23
Purdy Mill Road	200 32
Papineau Roads, 10th Concession Road	200 10
Papinea Roads, B Range, Lots 5 and 6	200 46
Papineau Roads, Concessions 10 and 11, Lot 11	197 85
Papineau Township Roads, 10th Concession Road	201 75
Pembroke and Mattawa Road	198 60
Pembroke and Mattawa Boundary to Dieux River	301 18
Pembroke and Mattawa Deux River Bridge	306 17
Pembroke and Mattawa, Buchanan Township	150 00
Pogue Lake Road, Sherwood	207 70
Price's Hill Road	298 31
Quadville and Vanbrugh Road	195 65
Railton Road, Loboro	189 84
Ramsay Lots 15 and 16 Road	850 79
Rama, Concession L Road	301 24
Ratter Township Road	200 81
Ratter Township, Warren and Crerar	299 58
Rolph, Lots 18 and 19	201 50
Rocher, Founda Road	262 74
Rockingham and Palmer Rapids Road	400 23
Sheffield and Hungerford Road	100 00
Stage Road, Wolfe Island	200 00
Springer Township, Concessions B and C Road	198 00
Springer Township, Bidal Road	199 76
Springer Township, Concession C Road	200 00
Springer Township, 3rd Concession Road	198 50
Stafford Proof Line Road	399 98
Stoqua Road	399 50
South and North Algona, Concession 3, South Algona Road	205 40
South and North Algona, Concession 5, South Algona Road	204 20

SUMMARY OF EXPENDITURE ON COLONIZATION ROADS AND BRIDGES
IN THE YEAR 1906.—*Continued.*

Name of Work	Expenditure
<i>East Division.—Continued.</i>	
South and North Algona, Gorman's Road	200 00
South and North Algona, 11th Concession Road	201 50
Shamrock and D'Acre Road	306 17
Sebastapol Township Road	208 25
Sebastapol 7th Concession Road	215 35
Strathitay and Palmer Rapids Road	200 00
Stanhope and Snowden, Peterson from Bobcaygeon	149 55
Stanhope and Snowden, Peterson east of Stanhope	250 07
Stanhope and Snowden, Gelert and Minden	147 04
Stanhope and Snowden, Gelert and Kinmount	200 00
Stanhope and Snowden, Dutch Line Road	100 00
Stanhope and Snowden, Carnarvon and Elsie Road	150 00
Summerville and Laxton, Monck Road east of Uphill	200 94
Summerville and Laxton, Road from Corson's Siding	200 62
Summerville and Laxton, Laxton and Bexley Boundary Road	199 99
Summerville and Laxton, Cameron Road	100 00
Summerville and Laxton, Baddow and Coboconk	400 12
Summerville and Laxton, 6th and 7th Road to Bobcaygeon	196 50
Summerville and Laxton, Bobcaygeon Road	100 70
Summerville and Laxton, North Quarter Line, Laxton	101 50
Sudbury and Blezard Road	2,046 92
Victoria Road, North of Uphill	400 00
Victoria Road, South of Uphill	500 00
Yannachar and Mallory Road	315 08
Wollaston Road	206 00
White Lake Road, Pakenham	200 00
Westport Bridges, Maberley and Perth Road	900 00
Washago Road, East into Rama	302 32
Widdifield, Concession 4 and 5 Road	250 00
Widdifield, Concession A and Lots 20 and 21	601 72
Widdifield, North Bay and Trout Lake Road	151 70
Widdifield, Concession 4 and 5, to T. N. O. Station	189 76
Warren and Monetteville Road, Jennings	401 00
Warrend and Monetteville Road, Appleby 1 and 2	202 75
Warren and Monetteville Road	298 99
Warren and Markstay, First Section	600 00
Warren and Markstay, Swamp	200 00
Wahnapitae and Sudbury Road	477 42
Waito Station Road, Greer Lake	200 00
Wylie, 6th Concession to Golden Lake	153 65
Wylie, 12th Concession Road	200 00
Wylie and Rolph, Beers' Hill Road	152 48
Wylie and Rolph, Pt. Alexander	200 83
Wylie, Dove Bay Station Road	201 25
Wilberforce, Concession 24 Road	150 85
Wilberforce Town Line North Algona Road	200 00
Wilberforce, Concession 12 Road	369 00
Wilberforce, 5th Line Road	503 24
Wilberforce, Concession 18 Road	203 54
Wilberforce, Concession 24	100 00
Wilberforce, Indian River Road	50 00
Whitefish Lake Road	303 00
Whitefish Lake and Blackdonald Road	280 00
Whitefish Lake and West Mountain Road	299 95
Mattawan Township Road, 1905	147 05
Inspection	3,760 26

SUMMARY OF EXPENDITURE ON COLONIZATION ROADS AND BRIDGES
IN THE YEAR 1906.—*Continued.*

Name of Work	Expenditure
<i>East Division.—Concluded.</i>	
Inspection. Balance 1905	\$ 94 10
Less Refunds Dysart Road, 1905	\$85,018 67 37 07
	\$84,981 60
<i>Temiskaming District.</i>	
Armstrong and Hilliard, Hilliard 4th to 7th (Contract)	\$1,234 37
Armstrong and Hilliard, Earleton to Lot 3	2,083 61
Armstrong and Hilliard, Hilliard, Con. 4 to White River	684 20
Armstrong and Beauchamp, Earleton to Lot 5, Beauchamp	3,000 10
Beauchamp, 4 and 5 to 6th Concession Bryce (Contract)	3,600 00
Beauchamp, 4 and 5 grading	1,148 78
Brethour, Lots 6 and 7	3,500 85
Casey, between Lots 2 and 3	797 29
Dack Township Bridge (Contract)	544 05
Dack Township Road, Charlton to T. N. & O. Ry.	454 01
Evanturel, 6 and 7 Road	1,788 48
Evanturel and Marter Boundary Road	396 00
Evanturel Township, grading roads	839 02
Firstbrook, Concession 5, East Town Line	2,001 15
Grading and Repairing Roads and Bridges	1,267 65
Harris, 3rd to 5th Concession (Contract)	637 50
Harris, 6th Concession to Lot 9 (Contract)	1,168 75
Harris, 6th Concession to Concession 2, Casey (Contract not complete) ...	157 50
Henwood, 5th Concession from Lot 6 to Cane (Contract)	1,506 25
Henwood, Concession 5, East Boundary	1,585 10
Harris, 2 and 3 North to Concession 6, grading	1,196 83
Harris, Lot 2, Concession 6, East and North to Moose Creek	1,482 73
Heaslip and Charlton Road, grading	2,509 90
Hudson, 4th Concession Road	200 52
Haileybury and Firstbrook, from Town Limit	499 90
Haileybury and Firstbrook, Fleming's Corner to Buck	500 59
Hilliard, 4 and 5 North, clearing and cutting	1,499 45
Haileybury and Cobalt	796 56
Harley and Hilliard, Thornloe East	996 10
Hudson, 4 and 5 Road	981 15
Interprovincial Line Road	50 00
Inspection	1,135 22
Jean Baptiste Bridge	340 84
Kearns and Armstrong Town Line from East Bridge	1,463 55
Robilliard, Concession 5, East Boundary	1,915 31
Savard and Marquis Boundary	578 65
Sheedy Road	201 31
Savard South Boundary Road, Balance 1905	318 75
Taylor Road from West Road	500 32
Windigo Road	723 11
Wright Creek Bridge, Balance 1905	63 36
Moose Creek Bridge, Balance 1905	6 98
Kearns and Hudson, Balance 1905	4 25
Charges, Post Office Orders	77
	\$46,150 81

SUMMARY OF EXPENDITURE ON COLONIZATION ROADS AND BRIDGES
IN THE YEAR 1906.—*Concluded.*

Name of Work	Expenditure
Recapitulation.	
North Division	\$66,435 72
West Division	21,991 24
East Division	84,981 60
Temiskaming District	46,150 81
Total Expenditure	\$219,559 37

HENRY SMITH,

Supt. Colonization Roads.

DEPARTMENT PUBLIC WORKS,

STATEMENTS
OF THE
ACCOUNTANT
AND
LAW CLERK

Department of Public Works, Ontario.
Toronto, February, 1907.

Hon. J. O. REAUME,
Minister of Public Works, Ontario.

SIR :

I have the honor to submit the following statements of maintenance and capital expenditure on public buildings, works, roads, aid to railways, etc., and of contracts entered into in connection therewith, being : (1) the expenditure on Maintenance and Repairs account for Government and Departmental Buildings, Institutions and Works for the year 1906; (2) the capital expenditure for public buildings, works, roads, railways, etc., for the year 1906; (3) the total capital expenditure on public buildings, public works, colonization and mining roads, aid to railways, etc., from the 1st July, 1867, to 31st December, 1906; (4) a classified statement showing (a) the expenditure for four years and six months, from 1st of July, 1867, to 31st December, 1871; (b) the expenditure for thirty-five years from 1st January, 1872, to 31st December, 1906; and (c) the grand total of expenditure from 1st July, 1867, to 31st December, 1906; and (5) a statement showing the several contracts and bonds entered into with His Majesty during the year 1906 for the execution of sundry works under the control of the Department

I have the honor to remain,

Sir,

Your obedient servant,

J. P. EDWARDS,

Accountant and Law Clerk.

STATEMENT No. 1.

Being statement of expenditure, on Maintenance Account for fuel, electric light, power, gas, water, vault fittings, furniture and furnishings, repairs, salaries, etc., for the following Departmental Buildings and Institutions and Works during 1906.

Name of Service.	Amount.
<i>Administration of Justice.</i>	\$ c.
Osgoode Hall, Toronto.....	11,385 93
<i>Education.</i>	
Normal and Model Schools and Educational Department, Toronto.....	3,055 43
Normal and Model Schools, Ottawa.....	4,667 18
Normal School Buildings, London.....	4,946 49
School of Practical Science, Toronto.....	28,600 00
<i>Maintenance and Repairs of Government Buildings.</i>	
Parliament and Departmental Buildings (including salaries of engineers, firemen, messengers, etc.) and furnishings Legislative Chamber and Speaker's apartments.....	50,185 56
Attorney-General's Department.....	1,011 33
Lands, Forests and Mines Department.....	3,557 33
Treasury Department.....	1,194 84
Audit Office.....	377 00
Public Works Department.....	1,169 70
Provincial Secretary's Department.....	3,442 17
Agricultural Department.....	1,321 41
Government House.....	14,228 88
Superintendent Locks, Dams, Bridges, etc.....	1,200 00
Lockmasters', Bridgetenders', and Caretakers' Salaries.....	3,099 17
Total.....	\$132,442 42

J. P. EDWARDS,

Accountant.

Department of Public Works, Ontario.

Toronto, February, 1907.

STATEMENT No. 2.

Being Statement of Expenditure, Capital Account on Public Buildings and Works, etc., for the year 1906. (See also Statement No. 3.)

Name of Work.	Amount.
s.	c.
<i>Public Buildings.</i>	
Asylum for Insane, Toronto.....	11,060 17
do Mimico.....	22,572 10
do London.....	9,074 06
do Hamilton.....	9,751 75
do Kingston.....	27,369 80
do Brockville.....	11,684 70
do Cobourg.....	3,412 37
do Penetanguishene.....	10,664 86
do Woodstock.....	68,405 48
do Idiots, Orillia.....	3,159 78
Central Prison, Toronto.....	23,005 49
Reformatory for Females, Toronto.....	2,608 86
Institute for Deaf and Dumb, Belleville.....	3,700 86
do Blind, Brantford.....	4,112 20
Educational Department and Normal and Model Schools, Toronto.....	5,267 59
Normal and Model Schools, Ottawa.....	3,809 31
do do London.....	3,668 15
Additional Normal Schools.....	4,618 33
School of Practical Science, New Buildings and Equipment.....	70,080 00
Agricultural College, Guelph.....	55,140 20
<i>Muskoka District.</i>	
General Repairs and Furnishings, Bracebridge.....	93 99
<i>Parry Sound District.</i>	
House for Gaoler, gaol, kitchen, etc., Parry Sound.....	2,328 85
Court House, Parry Sound.....	1,086 68
Lock-up, Powassan.....	750 00
<i>Algoma District.</i>	
General Repairs, gaol, and lock-ups and furnishings.....	320 31
<i>Thunder Bay District.</i>	
Furniture and Furnishings, plumbing, Port Arthur Gaol and Court House.....	1,016 16
<i>Rainy River District.</i>	
General Repairs to Lock-up and gaol, Ft. Francis.....	78 50
Lock-up, Mines Centre.....	421 70
Registry Office, Kenora.....	17 00
<i>Nipissing District.</i>	
Completion of Gaoler's House, additions and alterations, Gaol and Court	
House, North Bay.....	4,349 30
Repairs and alterations, Mattawa Lock-up.....	91 15
Lock-up at Cobalt.....	4,587 05
Lock-up at Markstay.....	600 00

STATEMENT No. 2.—*Concluded.*

Name of Work.	Amount.	
<i>Public Works.</i>	\$	c.
Muskoka Lakes Works, locks, bridges, dredging, Port Carling	2,580	47
Mary's and Fairy Lakes Works, to renew High Bridge and for cribbing at locks, etc.....	3,964	29
Dredging entrance to Neighick Lake.....	898	15
Improvement La Vase and Boon Creeks.....	804	22
Keewatin Bridge.....	200	00
Bridge at Rainy River.....	1,590	52
Sleeman's Bridge and approaches.....	1,044	80
Goulais River Bridge.....	1,892	58
Removing rock, North River.....	986	07
Sauble River Bridge, Massey.....	3,561	55
Spanish River Bridge.....	5,560	37
Vermillion River Bridge, Twp. Hammer.....	662	75
Venve River Bridge, Vernier.....	4,487	17
Wright's Creek Bridge, Temiskaming.....	1,059	95
North Road Bridge Twp. of Dymond.....	1,877	24
Mattawa Bridge.....	3,815	40
Whitstone Bridge, McKenzie Township.....	1,395	22
Manitowaba Bridge, McKellar Township.....	798	51
Bala Bridge.....	3,277	76
Canard River Bridge.....	1,000	00
Hoodstown Road Bridge, Big East River.....	800	00
La Mable Bridge, Dungannon Township.....	1,271	43
Beaver Creek Bridge, Monck do.....	996	77
Ma-lawaska River Bridge, near Arnprior.....	3,000	00
Sturgeon River Bridge, Gibbons Township.....	267	75
South River and Eagle Lake Bridges.....	673	03
Black Duck and Indian River Bridges (Co. Renfrew).....	869	48
Wolsley River Bridge, Township Mattawa.....	974	20
Axe Creek, Housey's Outlet Creek and Kashees Bridge, Muskoka.....	1,221	57
Katrina Bridge, Armour Township.....	1,257	23
Burnt River Bridge, Snowdon Township.....	2,017	11
La Blanche River Bridge, Tomstown.....	511	79
Surveys and Inspections, etc.....	663	82
Maintenance, Locks, Dams and Bridges.....	10,426	82
<i>Drainage Works.</i>		
McIntyre Creek.....	1,200	00
Medonte Township.....	1,800	00
Barkley Creek, Winchester Township.....	1,000	00
Silver Creek and Castor River.....	1,600	00
Allan, Arcand.....	2,200	00
Castor extension and 8th Concession.....	1,600	00
Miller Drain, Mountain Township.....	220	00
Baldwin Drain do.....	290	00
Big Creek Drain.....	1,000	00
Bromley Township.....	100	00
Dauphin Works.....	3,000	00
Colonization and Mining Roads.....	219,559	37
Aid to Railways (cash expended).....	130,860	68
Total.....	800,087	92

J. P. EDWARDS,

Accountant.

Department of Public Works, Ontario.

Toronto, February, 1907.

STATEMENT No. 3.

Being a statement on Capital Account for Public Buildings, Public Works, Colonization and Mining Roads, Aid to Railways, etc., as follows: (1) The total of expenditure for four years and six months, from the 1st of July, 1867, to the 31st of December, 1871; (2) The total of expenditure for thirty-four years from the 1st January, 1872, to the 31st of December, 1905; (3) The total of expenditure for the year 1906, and (4) The grand total of expenditure from the 1st of July, 1867, to the 31st of December, 1906.

Name of Work.	Expenditure 1st July, 1867, to 31st Dec., 1871.	Expenditure 1st Jan., 1872, to 31st Dec., 1905.	Expenditure 1906.	Total Expenditure to 31st Dec., 1906.
	\$ c.	\$ c.	\$ c.	\$ c.
BUILDINGS:—				
Government House.....	105,337 77	78,523 09		183,860 86
Old Parliament and Departmental Buildings (Construction Account).....	52,330 78	32,955 20		85,285 98
New Parliament and Departmental Buildings (Construction Account).....		1,282,679 04		1,282,679 04
New Parliament and Departmental Buildings (equipment, grounds, roads, plant house, etc.).....		230,934 62		230,934 62
Asylum for Insane, Toronto.....	173,014 71	223,900 41	11,060 17	407,975 29
“ Mimico.....		634,816 68	22,572 10	657,388 78
“ London.....	311,002 82	737,985 17	9,074 06	1,058,062 05
“ Hamilton.....		936,639 60	9,751 75	946,391 35
“ Kingston.....		499,593 56	27,369 80	526,963 36
“ Kingston (Branch).....		9,422 82		9,422 82
“ Brockville.....		501,894 61	11,684 70	513,579 31
“ Cobourg.....		126,504 24	3,412 37	129,916 61
“ Penetanguishene.....		47,409 13	10,664 86	58,073 99
“ Epileptics, Woodstock.....		80,542 40	68,405 48	148,947 88
“ Idiots, Orillia.....		573,644 73	3,159 78	576,804 51
Central Prison, Toronto.....	10,925 96	910,362 07	23,005 49	944,293 52
Andrew Mercer Reformatory for Fe- males, Toronto.....		258,965 32	2,608 86	261,574 18
Reformatory for Boys, Penetan- guishene.....	12,080 74	179,431 26		191,512 00
Institution for Deaf and Dumb, Bellville.....	90,215 11	253,548 84	3,700 86	347,464 81
Institution for Blind, Brantford.....	69,318 75	219,256 30	4,112 20	292,687 25
Education Department and Normal and Model Schools, Toronto.....	13,613 50	216,540 30	5,207 59	235,361 39
Normal and Model Schools, Ottawa.....		231,172 28	3,809 31	234,981 59
Normal School, London.....		100,798 23	3,668 15	104,466 38
Normal Schools, additional (four in all) Normal College, Hamilton (equipment Domestic Science Room).....		854 25		854 25
School of Practical Science (College of Technology).....	38,509 31	20,590 92		59,100 26
School of Practical Science, Queen's Park.....		252,535 56		252,535 56
School of Practical Science, New Chemistry and Milling and Mining Building.....		378,133 15	70,080 00	448,213 15
Agricultural College, Guelph.....		637,616 50	55,140 20	692,756 70
Dairy School, Strathroy.....		14,583 71		14,583 71
Dairy School, Kingston.....		19,722 18		19,722 18
Children's Shelter, Toronto.....		7,012 35		7,012 35
School of Mining, Kingston.....		4,070 00		4,070 00
Osgoode Hall, Toronto.....		148,062 85		148,062 85
Agricultural Hall.....	47,330 00	324 00		47,654 00

STATEMENT No. 3—*Continued.*

Name of Work.	Expenditure 1st July, 1867, to 31st Dec., 1871.	Expenditure 1st Jan., 1872, to 31st Dec., 1905.	Expenditure 1906.	Total Expenditure to 31st Dec., 1906.
	\$ c.	\$ c.	\$ c.	\$ c.
BUILDINGS—Continued:				
Government Farm, Mimico.....		4,296 34		4,296 34
Pioneer Dairy Farm, Algoma.....		5,178 43		5,178 43
Brock's Monument, Queenston Heights.....		4,605 31		4,605 31
Niagara River Fence.....		8,025 43		8,025 43
ALGOMA DISTRICT:—				
Court House, Gaol and Registry Office, etc., Sault Ste. Marie.....	2,469 52	28,146 63	320 31	30,936 46
Grand Manitoulin Island, three lock-ups, (Gore Bay, Little Current and Manitowaning).....		22,287 60		22,287 60
Lockup, Killarney.....		1,292 97		1,292 97
" Bruce Mines.....		3,117 48		3,117 48
" Webbwood.....		1,634 24		1,634 24
" Thessalon.....		2,221 99		2,221 99
" Massie.....		702 74		702 74
" Blind River.....		1,042 87		1,042 87
" Chapleau.....		1,126 49		1,126 49
" Wawa.....		1,330 16		1,330 16
" Cutler.....		864 70		864 70
" Chelmsford.....		511 90		511 90
" Nairn.....		300 00		300 00
THUNDER BAY DISTRICT:—				
Registry Office and Lockup, Addition to Court House, etc., Port Arthur.....	1,994 85	40,670 26	1,016 16	43,681 27
Lockup at Fort William.....		9,723 90		9,723 90
" Silver Islet, Lake Superior.....		2,304 79		2,304 79
" Nipigon.....		1,229 23		1,229 23
MUSKOKA DISTRICT:—				
Immigration Sheds at Gravenhurst.....		355 00		355 00
Registry Office and Lockup at Bracebridge.....		30,210 11	93 99	30,304 10
Lockup and Court Room at Huntsville.....		8,364 85		8,364 85
Lockup and Court Room at Bayside.....		300 00		300 00
PARRY SOUND DISTRICT:—				
Registry Office, Lockup and Court Room, etc., Parry Sound.....	1,715 20	25,369 02	1,086 68	28,170 90
House for Gaoler, etc., Parry Sound.....			2,328 85	2,328 85
Lockup at Magnetawan.....		645 56		645 56
Lockup and Court Room at Burk's Falls.....		6,449 33		6,449 33
Lockup at French River.....		1,194 12		1,194 12
" Dunchurch.....		609 00		609 00
" Emsdale.....		300 00		300 00
" Byng Inlet.....		1,232 35		1,232 35
" South River.....		500 00		500 00
" Powassan.....			750 00	750 00
NIPISSING DISTRICT:—				
Lockup at Mattawa.....		14,771 75	91 15	14,862 90
Lockup, Court Room and Registry Office, and Gaoler's House, North Bay.....		32,910 89	4,349 30	37,260 19
Lockup at Sudbury.....		12,595 48		12,595 48
" Sturgeon Falls.....		2,266 28		2,266 28
" New Liskeard.....		657 00		657 00
" Warren.....		600 00		600 00

STATEMENT No. 3.—*Continued.*

Name of Work.	Expenditure 1st July, 1867, to 31st Dec., 1871.	Expenditure 1st Jan., 1872, to 31st Dec., 1905.	Expenditure 1906.	Total Expenditure to 31st Dec., 1906.
	£ s. c.	£ s. c.	£ s. c.	£ s. c.
NIPISSING DISTRICT— <i>Continued</i> :—				
Lockup at Bonfield.....		694 67		694 67
“ Cobalt.....			4,587 05	4,587 05
“ Markstay.....			600 00	600 00
RAINY RIVER DISTRICT :—				
Lockup, Court Room and Gaoler's Residence, New Registry Office, etc., Rat Portage (Kenora).....		36,347 03	17 00	36,364 03
Lockup at Fort Francis.....		6,117 36	78 50	6,195 86
“ Mines Centre.....		783 78	421 70	1,205 48
“ Emo.....		1,888 94		1,888 94
“ Atikokan.....		1,566 31		1,566 31
“ Beaver Mills.....		1,840 71		1,840 71
“ Dryden.....		521 00		521 00
COUNTY OF HALIBURTON :—				
Registry Office at Minden.....		5,918 42		5,918 42
WORKS :—				
Young's Point Lock.....	30,035 07	1,157 65		31,192 72
Balsam and Cameron Lakes Locks....	15,715 20	8,243 82		23,959 02
Mary's and Fairy Lakes Lock Works and Bridge over Muskoka River at Huntsville.....		79,844 12		79,844 12
Mary's and Fairy Lakes Lock Works to renew high bridge above lock over Muskoka River, and renew cribbing above and below lock.....		2,611 44	3,964 20	6,575 73
Magnetawan Works, lock, swing bridge, dam and river improvements; dam and slide, Deer Lake; swing bridge, Township of Ryerson; dredging, Burk's Falls; and remov- ing obstructions, Ah-Mie-Lake.....		74,461 10		74,461 10
High Falls, Pigeon River, slide, dam, etc., (C. L. D.).....		9,706 07		9,706 07
Georgian Bay Works.....		7,149 97		7,149 97
Landing Pier at Port Elgin.....		2,750 00		2,750 00
Landing Pier at Southampton.....		2,022 63		2,022 63
Docks at Southampton, Saugeen River.....		1,814 04		1,814 04
Docks on the Rainy River.....		3,088 44		3,088 44
Docks (landing) at Beaudrault's, Wabigoon.....		777 95		777 95
Muskoka Lakes Works.....		21,915 30		21,915 30
Muskoka Lakes Works, lock, bridges and dredging at Port Carling.....	34,542 54	25,655 67	2,580 47	62,778 68
Muskoka Lakes Works, cut and bridge at Port Sandfield.....	9,761 80	7,081 06		16,842 86
Muskoka Lakes Works, Muskoka Falls, works and bridges at Bala.....		8,579 37		8,579 37
Muskoka Lakes Works, Joseph River Works (less contribution).....		486 87		486 87
Nipissing Lake Works.....		9,182 17		9,182 17
Couchiching Lake Works.....		427 82		427 82
Mud Lake Works (Township of Dalton).....		1,502 32		1,502 32
Kushog Lake Dam.....		300 00		300 00
Mississicua Lake Dam.....		4,989 84		4,989 84

STATEMENT No. 3—Continued.

Name of Work.	Expenditure 1st July, 1867, to 31st Dec., 1871.	Expenditure 1st Jan., 1872, to 31st Dec., 1905.	Expenditure 1906.	Total Expenditure to 31st Dec., 1906.
	\$ c.	\$ c.	\$ c.	\$ c.
WORKS—Continued:				
Star Lake Works.....		412 22		412 22
Manitou Lake Works, dam at outlet, etc., Rainy River District.....		2,794 14		2,794 14
Inkerman Dam, removal of (County Dundas).....		1,000 00		1,000 00
Bottle Lake Dam and Mississicua Creek Dam.....		4,068 72		4,068 72
Shoal Lake and Lake of the Woods Improvements, Ash Rapids.....		5,998 25		5,998 25
Mill Creek Improvements (County Prescott).....		1,000 00		1,000 00
Lake of Bays, dredging mouth of river at outlet of.....		581 82		581 82
Peninsula Creek Improvements, bridges, cribbing, etc.....		37,295 66		37,295 66
Stoney Creek Works Township of Ops).....		4,828 25		4,828 25
Union Creek Improvements.....		1,050 63		1,050 63
Bear Creek Works, dam and slide.....		1,617 52		1,617 52
Lake Scugog Works, dredging at Port Perry.....		977 53		977 53
Lake Scugog Flats Road.....		1,500 00		1,500 00
Neighick Lake, dredging at entrance to LaVase and Boon Creeks, improve- ments to.....			898 15	898 15
			804 22	804 22
Cobb's Lake Outlet.....		1,102 08		1,102 08
Gull and Burnt River Works, dams, slides and bridges, etc.....		100,716 61		100,716 60
Muskoka River Works.....		42,670 53		42,670 53
" bridge at South Falls.....		1,000 00		1,000 00
" " Port Sydney.....		1,000 00		1,000 00
Sydenham River Works.....	374 76	1,781 50		2,156 26
Nottawasaga Works.....	1,708 82	4,206 27		5,915 09
Kaministiquia River Works.....	197 10	22,667 92		22,865 02
Scugog River Works (including Lindsay lock and swing bridges).....	27,760 34	70,137 04		97,897 38
Pigeon River Works (County of Victoria).....	1,527 40	3,472 22		4,999 62
Otonabee River Works.....		9,162 91		9,162 91
Balsam River Works.....		16,585 11		16,585 11
Wye River Works.....		5,176 98		5,176 98
Squaw River Works.....		1,688 16		1,688 16
Moose River Works (Co. of Stormont).....		1,000 00		1,000 00
Black River Works (Lake Simcoe).....		3,136 10		3,136 10
Jean Baptiste River, construction of bridge over (Township of Beau- champ).....		2,850 00		2,850 00
Mattawa River Works and Bridge.....		7,486 63	3,815 40	11,302 03
Wabisis River Works (Townships Dy- mond, Harris and Kearns).....		1,340 51		1,340 51
Wabisis River Bridges.....		2,773 33		2,773 33
Wabisis Creek, to construct bridge over.....		1,760 08		1,760 08
Squaw River Works, dam at Harvey.....		581 56		581 56
Indian River Works, deepening (Townships Sarawak and Keppell).....		1,850 82		1,850 82
Whitefish River, removing obstructions.....		249 15		249 15
North River, removing obstructions.....		909 06	986 07	1,895 13
Bar River, (Township of McDonald) removing obstructions.....		130 55		130 55

STATEMENT No. 3—*Continued.*

Name of Work.	Expenditure 1st July, 1867, to 31st Dec., 1871.		Expenditure 1st Jan., 1872, to 31st Dec., 1905.		Expenditure 1906.		Total Expenditure to 31st Dec., 1906	
	\$	c.	\$	c.	\$	c.	\$	c.
<i>WORKS—Continued :—</i>								
Cassimer River, removing obstructions			205	56			205	56
McKenzie Creek Improvements			200	35			200	35
Snake River Improvements			140	65			140	65
Madawaska River, swing bridge at Combermere; bridge Burnston, and bridge Township of Raglan			12,171	43			12,171	43
Madawaska River, bridge near Arn- prior					3,000	00	3,000	00
Nation River Works, bridge, etc.			15,877	23			15,877	23
Nation River, contribution			4,000	00			4,000	00
Petawawa River Bridge			3,879	25			3,879	25
Sturgeon River Bridge (Township of Field)			3,616	08			3,616	08
Sturgeon River Bridge (Township of Gibbons)			2,342	60	267	75	2,610	35
To construct Steel Bridge at outlet Lake of the Woods, at Rat Portage (Kenora)			26,455	82			26,455	82
Rainy River Road Bridge			4,429	84			4,429	84
Stanley Bridge, Thunder Bay District			8,136	09			8,136	09
Blind River Bridge			2,772	34			2,772	34
Buck Lake Bridge, to rebuild			305	06			305	06
Black River Bridge, to rebuild (Town- ship of Draper, Muskoka)			509	48			509	48
To rebuild bridges in Frontenac, de- stroyed by fires; Clyde River, Mud Lake and Concession 1st, Clarendon			3,288	06			3,288	06
Kinmount Bridge			1,500	00			1,500	00
Bridge over Jean Baptiste (Township of Armstrong)			98	31			98	31
Bridge on Round Lake Road			19	00			19	00
Baysville Bridge			2,047	50			2,047	50
Calabogie Bridge, Township of Bagot			1,800	00			1,800	00
Echo River Bridge			1,332	11			1,332	11
Wasdale Bridge (Ontario and Simcoe)			1,000	00			1,000	00
Wahnapiatae River Bridge, and ap- proaches			4,642	49			4,642	49
Delta Creek Improvements			99	24			99	24
Bridge over west arm Lake Nipissing			4,903	99			4,903	99
Wolsley River Bridge, Township of Mattawa					974	20	974	20
Bridge over Sunday Creek			603	00			603	00
Bridge over La Blanche River			2,929	87			2,929	87
Severn Bridge, Township of Morrison			3,350	00			3,350	00
Seguin River Bridge			3,754	00			3,754	00
Bridge on Wawa Road			1,198	39			1,198	39
Black Bridge, (Muskoka) construction of			1,500	00			1,500	00
Gannon's Narrows Bridge (construc- tion)			1,000	00			1,000	00
Chenong Lake Bridge			3,500	00			3,500	00
Veuve River Bridge, Township of Dunnette			918	70			918	70
Veuve River Bridge, Township of Verner					4,487	17	4,487	17
Bridge over Wright's Creek, Township of Casey			753	40	1,059	95	1,813	35
Reflooring Bridge at Pine Wood, Rainy River District			375	00			375	00

STATEMENT No. 3—*Continued.*

Name of Work.	Expenditure 1st July, 1867, to 31st Dec., 1871.		Expenditure 1st Jan., 1872, to 31st Dec., 1905.		Expenditure 1906.		Total Expenditure to 31st Dec., 1906.	
	\$	c.	\$	c.	\$	c.	\$	c.
<i>WORKS—Continued:—</i>								
Bracebridge Bridge (conditional).....			7,000	00			7,000	00
Bridge over Portage Bay, Keewatin								
Bridge.....			4,809	50	200	00	5,009	50
Martland Township Bridge.....			201	50			201	50
Bridge at Baysville, Townships Mc-								
Lean and Ridout.....			900	00			900	00
Maskanonge Creek, Township of Cas-								
simer, removing obstructions.....			499	92			499	92
South River and Eagle Lake Bridges,								
Township of Machar.....			622	74	673	13	1,295	87
McCarthy Creek Bridge, Township of								
Gibbons.....			300	00			300	00
Powassan Bridge.....			300	00			300	00
Payne River Bridge, Township of								
Finch.....			2,500	00			2,500	00
Berriedale Bridge, Township of Armour			935	77			935	77
Hoodstown Road Bridge, Township of								
Chaffey.....			1,200	00			1,200	00
Hoodstown Road Bridge, over Big								
East River.....					800	00	800	00
Maple Island Bridge, Magnetawan								
River, Township of McKenzie.....			993	32			993	32
Sleeman's Bridge and approaches.....					1,044	80	1,044	80
Goulais River Bridge.....					1,892	58	1,892	58
Sauble River Bridge, Massey.....					3,561	55	3,561	55
Spanish River Bridge.....					5,560	37	5,560	37
Vermillion River Bridge, Township of								
Hanmer.....					662	75	662	75
North Road Bridge, Township of								
Dymond.....					1,887	24	1,887	24
Whitestone Bridge, McKenzie Town-								
ship.....					1,395	22	1,395	22
Manitowaba Bridge, McKellar Town-								
ship.....					798	51	798	51
Bala Bridge.....					3,277	76	3,277	76
Canard River Bridge.....					1,000	00	1,000	00
La Mable Bridge, Dungannon Town-								
ship.....					1,271	43	1,271	43
Beaver Creek Bridge, Monk Township					996	77	996	77
Black Duck and Indian River Bridges					869	48	869	48
Axe Creek, Housey's Outlet and								
Kahshee Bridges.....					1,221	57	1,221	57
Katrine Bridge, Armour Township...					1,257	23	1,257	23
Burnt River Bridge, Township of								
Snowdon.....					2,017	11	2,017	11
La Blanche River Bridge, Tomstown.					511	79	511	79
Rainy River Bridge.....			6	25	1,990	52	1,996	77
Indian Point Bridge, Manitoulin Island			1,339	96			1,339	96
Beaudette River to aid in dredging, etc.			3,000	00			3,000	00
Mississippi River Improvements (De-								
low Carleton Place).....			4,730	71			4,730	71
Head River Improvements (Township								
of Laxton and Cardon).....			976	82			976	82
Moira River Improvements (Township								
of Thurlow).....			2,135	32			2,135	32
Muskrat River Improvements.....			1,861	98			1,861	98
Payne River Works.....			4,000	00			4,000	00
Otonabee River Bridge.....			2,500	00			2,500	00
Trent River Works.....			2,000	00			2,000	00

STATEMENT No. 3—*Continued.*

Name of Work	Expenditure 1st July, 1867, to 31st Dec., 1871.	Expenditure 1st Jan., 1872, to 31st Dec., 1905.	Expenditure 1906.	Total Expenditure to 31st Dec., 1906.
	\$ c.	\$ c.	\$ c.	\$ c.
<i>WORKS—Continued:—</i>				
Bridge, Township of Cambridge.....		1,000 00		1,000 00
Indian Point Bridge (Manitou Island).....		2,596 61		2,596 61
Mississauga River Bridge, repairs.....		4,355 94		4,355 94
Stoney Creek Bridge, Ryerson.....		831 68		831 68
Damage by raising waters, near Rat Portage (Kenora).....		800 00		800 00
Washago and Gravenhurst Road.....	25,188 69	7,603 43		32,792 12
Washago Wharf.....		489 22		489 22
Portage du Fort Bridge, Ottawa River.....		10,747 99		10,747 99
Des Joachims Rapids, bridge and approaches.....		9,937 72		9,937 72
Surveys, Inspections, Arbitrations and Awards, etc.....	1,137 34	52,686 65	663 82	54,487 81
Deer Lake Works, dam and slide, (Township of Anstruther).....		1,420 17		1,420 17
Nogies Creek Works.....		2,144 57		2,144 57
Cashmere Dam, Middlesex (ob- structions).....		1,144 19		1,144 19
Eagle Lake Works, to construct dam at outlet.....		1,173 84		1,173 84
Bass Lake Dam, Township Galway, Peterborough.....		1,000 00		1,000 00
To remove obstacles from navigable streams.....		513 02		513 02
Bonnechere River Works.....		338 50		338 50
Talbot River Works.....		605 95		605 95
Repairs and Maintenance Locks, Dams, Slides, Bridges, etc.....		203,163 62	10,426 82	213,590 44
<i>DRAINAGE WORKS:—</i>				
Tilbury East outlet Drain.....		3,020 00		3,020 00
Beaver Creek Drain, Cornwall Township.....		750 00		750 00
Pelée Island Drainage, 63 Victoria, Chapter viii.....		1,500 00		1,500 00
Miscellaneous Drainage.....		27 00		27 00
Drainage Works, (Township of Elma).....		4,000 00		4,000 00
Big Creek Drain, (Townships West and North Tilbury).....		8,367 30		8,367 30
Outlet Drain, Eastern Township.....		2,480 00		2,480 00
Petite Castor River and Annabel Creek Drainage Works (Township Win- chester).....		7,700 00		7,700 00
Becquith Creek Drain (Cumberland and Clarence Townships).....		1,000 00		1,000 00
Kenyon, Charlottenburg, Cornwall and Roxborough Townships.....		700 00		700 00
Moncklands Drainage Scheme, Rox- borough Township.....		1,200 00		1,200 00
Nesbit and Rogers Drains (Township Bosanquet).....		300 00		300 00
Mud Lake Drainage (Tp. Keppell).....		963 23		963 23
Fraser Creek Drainage (Township Rox- borough).....		300 00		300 00
Outlet for Durham Creek (Township Brooke).....		1,300 00		1,300 00
North Branch Drainage Works (Town- ships Roxborough and Cornwall).....		2,000 00		2,000 00
Pottawatomie River Drainage Works (Township Derby).....		3,500 00		3,500 00

STATEMENT No. 3—*Continued.*

Name of Work.	Expenditure 1st July, 1867, to 31st Dec., 1871.	Expenditure 1st Jan., 1872, to 31st Dec., 1905.	Expenditure 1906.	Total Expenditure to 31st Dec., 1906,
	\$ c.	\$ c.	\$ c.	\$ c.
DRAINAGE WORKS— <i>Continued</i> :—				
Douro Drainage Works (Township Duro).....		1,200 00		1,200 00
Ruscomb Drainage Works (Township Rochester).....		3,000 00		3,000 00
Forbes Drainage Works (Township East Tilbury).....		2,000 00		2,000 00
Pelee Point Drainage Works (Town- ship Mersea).....		2,000 00		2,000 00
Snake River (Township Bromely).....		7,700 00		7,700 00
Lalonde Drainage Works.....		900 00		900 00
Silver Creek and Castor River Works, Townships Mountain, Osgoode, South Gower and Winchester.....		2,400 00		2,400 00
Long Swamp Drainage Works (or Davidson) Township of Keppel.....		1,500 00		1,500 00
McGregor Creek Works, Township of Howard.....		2,000 00		2,000 00
McIntyre Creek.....			1,200 00	1,200 00
Medonte Township.....			1,800 00	1,800 00
Barkley Creek, Winchester Township.....			1,000 00	1,000 00
Silver Creek and Castor River.....			1,600 00	1,600 00
Allan, Arcand.....			2,200 00	2,200 00
Castor Extension and 8th Concession.....			1,600 00	1,600 00
Miller Drain, Township of Mountain.....			220 00	220 00
Baldwin Drain, Township of Mountain.....			290 00	290 00
Big Creek.....			1,000 00	1,000 00
Bromley Township.....			100 00	100 00
Dauphin Works.....			3,000 00	3,000 00
Surveys and Drainage Swamp Lands (Prov. Act.).....	25,489 17	11,111 31		36,600 51
Aldborough Drainage Works.....		7,199 02		
Brooks ".....	15,218 95	19,528 78		
Delaware ".....		5,740 93		
Dunwich ".....	6,339 30	3,766 56		
Ekfrid, Caradoc and Metcalf Drainage Works.....	11,308 75	2,358 91		
Grey Drainage Works.....	6,127 55	2,047 92		
Moore ".....	194 80	16,896 78		
Mosa ".....	9,005 41	3,709 34		329,980 93
Nissouri West ".....		8,178 50		
Raleigh ".....	25,191 15	12,818 49		
Russell ".....		11,543 77		
Sarnia ".....		40,540 55		
Sombra ".....		53,169 04		
Tilbury East ".....	17,757 50	17,510 12		
Tilbury West ".....		31,577 06		
Williams East ".....		2,221 75		
Temiskaming Railway Surveys.....		24,823 58		24,823 58
Roads, Township Ryerson.....	1,409 04	5,886 02		7,295 06
Clearing and Log Houses on free grant lands (Settlers' Homestead Fund).....	3,682 03	13,098 72		16,780 75
Colonization and Mining Roads.....	189,595 91	4,048,181 55	219,559 37	4,457,336 83

STATEMENT No. 3 —*Concluded.*

Name of Work.	Expenditure 1st July, 1867, to 31st Dec., 1871.	Expenditure 1st Jan., 1872, to 31st Dec., 1905.	Expenditure 1906.	Total Expenditure to 31st Dec., 1906.
	\$ c.	\$ c.	\$ c.	\$ c.
Aid to Railways.....		7,577,063 69	130,800 68	7,707,894 37
NOTE:—				
Certificates issued to railways.....				\$ 9,785,818 05
Cash paid direct to rail- ways.....	1,794,862 42			
Aid granted 2,442 ⁸¹⁶ / ₁₀₀₀ miles.....				11,580,680 47
Certificates outstanding	3,872,786 10			
Actual cash expended to 31st Dec., 1905.....	\$ 7,707,894 37			
Totals.....	1,389,147 67	23,280,756 97	800,084 92	25,469,989 56

Department of Public Works, Ontario,
Toronto, February, 1906.

J. P. EDWARDS,
Accountant.

STATEMENT No. 4.

Being classified statement showing the Expenditure on Capital Account for Public Buildings, Public Works, Roads, Railways, etc.: (1) The total expenditure for four years and six months, from the 1st of July, 1867, to the 31st December, 1871: (2) The total expenditure for thirty-five years, from the first of January, 1872, to the 31st December, 1906, and (3) The grand total expenditure from the first of July, 1867, to the 31st December, 1906.

Name of work.	Expenditure 1st July, 1867, to 31st Decem- ber, 1871.	Expenditure 1st Jan., 1872, expenditure to 31st Decem- ber, 1906.	Total 31st Decem- ber, 1906.
	\$	\$	\$
1. Asylums for the Insane, etc., at Toronto, Mimico, London, Hamilton, Kingston, Brockville, Orillia, Cobourg, Penetanguishene and Woodstock.....	484,017 53	4,544,412 42	5,033,429 95
2. Penal Institutions, viz., Reformatory for Females, Reformatory for Boys and Central Prison.....	23,006 70	1,374,469 00	1,397,475 70
3. Educational Institutions, viz., Institutions for Deaf and Dumb, Institution for the Blind, School of Practical Science, Normal and Model Schools, Toronto, Ottawa and London.....	211,656 70	1,779,708 62	1,991,365 32
4. Agricultural Institutions, viz., Agricultural College, Guelph; Dairy Schools, Kingston and Strathroy; Dairy Farms, Mimico and Algoma.....	47,350 00	736,881 36	784,211 36
5. Buildings for Administration of Justice, being Osgoode Hall, and Court Houses, Lock-ups, etc., in the Districts of Algoma, Thunder Bay, Muskoka, Parry Sound, Nipissing and Rainy River.....	6,179 57	476,965 45	483,145 02
6. Parliament and Departmental Buildings, and Government House.....	157,668 55	1,625,091 95	1,782,760 50
7. Works for the improvement of Navigation, such as locks, dams, slides, etc.....	122,760 37	906,488 36	1,029,248 73
8. Works for the improvement of Transportation, such as bridges, piers, roads, etc.....	26,597 73	277,962 13	304,559 86
9. Drainage Works, Expenditures and Advances to Municipalities.....	116,632 58	327,339 27	443,971 85
10. Miscellaneous Expenditure, viz., Brock's Monument, Niagara River Fence, Clearing of Log Houses, Township of Ryerson and Temiskaming surveys.....	3,682 03	50,908 04	54,590 07
11. Colonization and Mining Roads.....	189,595 91	4,267,740 92	4,457,336 83
12. Aid to Railways (actual cash expended).....		7,707,894 37	7,707,894 37
Grand Total.....	1,389,147 67	23,680,841 89	25,469,989 56

J. P. EDWARDS,

Department of Public Works, Ontario,
Toronto, February, 1907.

Accountant

STATEMENT No. 5.

Statement of Contracts and Bonds, etc., entered into with His Majesty in 1906.

Date.	Service.	Subject of Contract.	Contractor.	Sureties.	Description of Contract.	Amount.
Feb. 28.....	Nipissing District.....	Supply of timber for North Road Bridge across deep gully, Township of Dymond.	David Irwin of the Township of Harley, District of Nipissing.	None	Square and sawn timber per thousand B. M.	\$ 20 00
March 14.....	Nipissing District.....	Erection of a Timber Bridge across a deep gully, Township of Dymond—North Road Bridge.	Harry Kerr of the Town of New Liskeard, District of Nipissing.	None	All round and flattened timber per lineal foot. All square timber and planking per thousand B. M.	12 c. 7 00
March 15.....	Asylum for Insane, Kingston.	Reconstruction of the Laundry Building.	Robert N. F. McFarlane of the City of Kingston.	Hugh Douglass and William G. Simmons both of the City of Kingston.	.....	7,593 00
April 17.....	Nipissing District.....	Erection of a Lock-up in the Town of Cobalt.	Edward D. Pittam of the Town of Haliburton.	None	.....	3,765 00
May 25.....	Nipissing District.....	Erection of Steel Superstructure across the Vevey River near the Village of Verner.	James A. Vance of the Village of New Hamburg.	None	.....	3,056 03
May 25.....	Asylum for Epileptics at Woodstock.	Erection of two Cottages.....	The Fisher Company, Limited, of the City of Brantford.	Fred Corey, James C. Spence, Leslie Anguish and George Sigman, of the City of Brantford.	.....	43,400 00
June 4.....	Nipissing District.....	Erection of a Timber Bridge across Wright's Creek.	George Roberts & Son of the Village of Judge.	None	.....	900 00

STATEMENT No. 5. — *Continued.*Statement of Contracts and Bonds, etc., entered into with His Majesty in 1906. — *Continued.*

Date.	Service.	Subject of Contract.	Contractor.	Sureties.	Description of Contract.	Amount.
June 9.	District of Parry Sound.	Erection of a House for Gaoler, also the brick veneering of exterior walls of rear portion of Court House, and certain alterations and repairs to the Court House at Parry Sound.	W. H. Clabbe of the Town of Parry Sound.	None.	.....	\$ 3,100 00
June 15.	Departmental Buildings and Institutions.	Supply of soft coal for Government House, Parliament Buildings, Education Department, School of Science and Osgoode Hall.	The P. Burns Co. of the City of Toronto.	George D. McDonald and Edward A. Burns of the City of Toronto.	Per ton.	4 10
June 15.	London Normal School	Supply of hard coal for the season, 1906-7.	Chantler Brothers of the City of London.	J. A. Tancock and Chas. Cowan, both of the City of London.	Per ton.	6 75
June 15.	Institution for the Blind, Brantford.	Supply of hard and soft coal for the season 1906-7.	Frederick Henry Walsh of the City of Brantford.	W. A. Hollinrake and Chas. W. Yapp, both of the City of Brantford.	Hard coal per ton Soft coal per ton. . .	5 74 4 32
June 15.	Ottawa Normal School.	Supply of hard coal for the season 1906-7.	The C. C. Ray Company, Limited, of the City of Ottawa.	George P. Murphy and J. M. Hurrecombe, both of the City of Ottawa.	Hard coal per ton.	5 83
June 15.	Parliament and Departmental Buildings and Institutions, Toronto.	Supply of hard coal, hard wood, pine wood, and pine slabs for the season 1906-7.	William McGill & Company of the City of Toronto.	George N. Williamson and Edward Reeves, both of the City of Toronto.	Grate coal per ton. Eggs, stove and nut per ton. Pea coal per ton. . . Hardwood per c'd. Pine wood per c'd. Pine slabs per c'd.	5 41 5 61 3 90 6 50 5 00 4 00
June 15.	London Normal School	Supply of pine slabs for the season 1906-7.	John Mann & Son of the City of London.	None.	Per cord.	4 00

June 15,	Institution for the Deaf and Dumb, Belleville	Supply of hard coal for the season 1906-7.	Nathaniel Allen of the City of Belleville.	John McKeown and Thos. Stewart, both of the City of Belleville.	Grate and large egg coal per ton. Small egg stove and nut. Hard coal per ton.....	5 39 5 65
June 15,	Ottawa Normal School	Supply of hard wood and pine slabs for the season 1906-7.	J. G. Butterworth & Company of the City of Ottawa.	E. H. McPhee and E. B. Butterworth, both of the City of Ottawa.	Hardwood per c'd. Pine slabs per c'd.	5 59 2 10
July 11,	Agricultural College, Guelph.	Renoval. alteration and construction of the masonry in connection with greenhouses.	Guelph Cement, Brick, Block and Paving Company, Limited, of the City of Guelph.	None		497 80
July 11,	Agricultural College, Guelph.	Erection and completion of a new super-structure of the greenhouse.	The King Construction Company of the City of Toronto.	None		4,538 45
July 11,	District of Haliburton.	Erection of a Steel Bridge near the Village of Irondale, over the Burnt River.	James A. Vance of the Town of New Hamburg.	None		670 00
July 12,	Institution for the Deaf and Dumb, Belleville	Construction of Cement Concrete Walks on the grounds.	F. Dolan & Sons of the City of Belleville.	None	Per square foot.....	16½c.
July 18,	Agricultural College, Guelph.	Erection of a Steel Water Tank and Tower upon the grounds.	The Canadian Bridge Company, Limited, of the Town of Walkerville.	None		5,490 00
July 18,	Asylum for the Insane, Brockville.	Erection of a Roof-house.	George E. Parslow and Edward A. Horton of the City of Brockville.	None		1,067 00
July 18,	Toronto Normal School	The mechanical ventilation.	The Fred Armstrong Company, Limited, of the City of Toronto.	None		3,500 00
July 19,	Agricultural College, Guelph.	The erection of an addition to the Chemical Laboratory.	Shadrack F. Whedham of the Town of Bramford.	None		10,700 00

STATEMENT No. 5.—*Continued.*
 Statement of Contracts and Bonds, etc., entered into with His Majesty in 1906.—*Continued.*

Date.	Service.	Subject of Contract.	Contractor.	Sureties.	Description of Contract.	Amount.
July 28.....	Nipissing District.....	Erection of a Timber Bridge across the Vermillion River in the Township of Hammer.	Louis Brisard of the Township of Hammer.	None	.....	\$ 600 00
July 30.....	London Normal School.....	Painting of walls and ceiling.....	Richard Booth of the City of London.	None	.....	912 00
July 30.....	Ottawa Normal and Model Schools.....	The renewal of plumbing work.....	John McKinley and Wm. Northwood of the City of Ottawa.	None	.....	1,875 00
July 30.....	Ottawa Normal and Model Schools.....	Planking of girls' playground, north side of building, and flooring two class rooms in Model Schools.	Samuel J. Davis of the City of Ottawa.	None	.....	1,199 00
July 30.....	Bridge over Mattawa River in the Town of Mattawa.	Erection of a steel superstructure.	Dickson Bros. of the Town of Campbellford.	None	.....	9,132 00
July 30.....	Government House, Toronto.	Erection of a Rose House.	Thos. V. Gearing & Co. of the City of Toronto.	None	.....	2,075 00
July 30.....	Institution for the Blind, Brantford.	Construction of granolithic walks on the grounds of the Institution.	The Fisher Company of the City of Brantford.	None	Per square foot.	14c.
July 30.....	Asylum for Epileptics, Woodstock.	Concrete walks to the Asylum grounds.	Silicia Barytic Stone Company of the Town of Woodstock.	None	Laying walks per lineal foot. Extra excavation per cubic yard.	41c. 25c.
August 1.....	Asylum for the Insane, Brockville.	Supply and installation of six No. 6 Sovereign Hot Water Boilers in Corridors	George Ross & Co. of the City of Brockville.	None	.....	1,100 00

August 15.....	District of Algoma in the Township of Fenwick.	Erection of a steel superstructure of bridge over the Goulais River.	Dickson Brothers of the Town of Campbellford.	None	.....	\$ 4,025 00
August 15.....	Asylum for the Insane, Kingston.	Rebuilding roof of a Boiler House.	Robert H. F. McFarlane of the City of Kingston.	None	.....	1,452 00
August 24.....	Asylum for the Insane, Hamilton.	Supply and setting up of two horizontal multi-tubular boilers.	The Polson Iron Works Limited, Toronto.	None	.....	1,608 00
August 24.....	Asylum for the Insane, London.	Supply and setting up of two horizontal multi-tubular boilers.	The Polson Iron Works Limited, Toronto.	None	.....	1,730 00
August 29.....	Asylum for the Insane, Hamilton.	Supply and setting up of one horizontal multi-tubular boiler.	The Polson Iron Works Limited, Toronto.	None	.....	857 00
September 5.....	Parliament and Departmental Buildings, Toronto.	Painting corridors.	Alexander M. Browne of the City of Toronto.	None	.....	Per yd 22c
September 20.....	Agricultural College, Guelph.	Erection of superstructure for glass houses.	The King Construction Company of the City of Toronto.	None	.....	8,000 00
October 2.....	Institution for the Blind, Brantford.	Erection and completion of ice house (painting excepted).	James Wright of the City of Brantford.	None	.....	1,035 00
October 13.....	Agricultural College, Guelph.	Erection and completion of sequent work and alterations of building of glass house.	Shadrack F. Whelan of the Town of Brantford.	None	.....	1,936 00
October 20.....	District of Muskoka...	Erection of steel superstructure of bridge over the Muskoka River in the Village of Bala.	The Ontario Bridge Company of the City of Toronto.	None	.....	2 spans \$1,810 Steel joints, \$515
October 20.....	District of Muskoka...	Erection of steel superstructure and pedestals for bridge over the north branch of Muskoka River two miles south of Huntsville.	The Algoma Steel Bridge Company of the Town of St. Marie.	None	.....	2,875 00

STATEMENT No. 5.—*Concluded.*Statement of Contracts and Bonds, etc., entered into with His Majesty in 1906.—*Concluded.*

Date.	Service.	Subject of Contract.	Contractor.	Sureties.	Description of Contract.	Amount.
October 25.....	District of Algoma....	Erection of steel superstructure of bridge over the Spanish River in the Village of Webbwood.	Wm. G. Genks and Andrew A. Dresser of the Town of Sarnia.	None	.....	\$ 8,000 00
November 7.....	Osgoode Hall, Toronto.	Vault fittings for the Department of Records and Writs.	Jas. C. Henry and Wilbert H. Adams of the City of Toronto.	None	.....	1,812 00
November 20....	Asylum for Epileptics, Woodstock.	Erection of a barn.....	Thos. Warren Nagle and Walter Mills, both of the Town of Ingersoll.	None	.....	5,627 00
December 18....	District of Algoma....	Steel ribs for concrete arch for bridge over Sable River near Massey, township of May.	Ontario Bridge Company of the City of Toronto.	None	.....	1,090 00
December 18....	Public Works Department, Parliament Buildings.	Vault fittings.....	Jas. C. Henry and Wilbert H. Adams, of the City of Toronto.	None	.....	410 00

DEPARTMENT OF PUBLIC WORKS, ONTARIO,
TORONTO, FEBRUARY, 1907.

J. P. EDWARDS

Accountant and Law Clerk

REPORT

RELATING TO THE REGISTRATION OF

Births, Marriages and Deaths

IN THE

PROVINCE OF ONTARIO

FOR THE

Year Ending 31st December,

1905

(Being the 36th Annual Report).

PRINTED BY ORDER OF
THE LEGISLATIVE ASSEMBLY OF ONTARIO



TORONTO :

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1907.

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TO HIS HONOUR SIR WILLIAM MORTIMER CLARK,
Lieutenant-Governor of the Province of Ontario.

MAY IT PLEASE YOUR HONOR:

I herewith beg to present for your consideration the Thirty-sixth Annual Report of the Registrar-General, relating to the registration of Births, Marriages and Deaths in the Province of Ontario, during the year 1905.

Respectfully submitted,

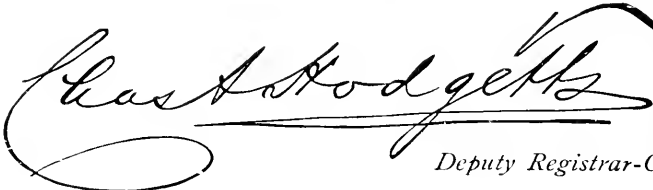
W. J. HANNA,
Registrar-General of Ontario.

SIR.—I have the honor to submit for your approval, the Thirty-sixth Annual Report made in conformity with and under the provisions of The Act respecting the Registration of Births, Marriages and Deaths in the Province of Ontario, for the year ending December the thirty-first, 1905.

I have the honor to be,

Sir,

Your obedient servant,

 M.D.
Deputy Registrar-General

TO HON. W. J. HANNA,
Registrar-General of Ontario.

Report Upon

Births, Marriages and Deaths

For the Year 1905.

The following report of births, marriages and deaths is for the calendar year ending December 31st, 1905.

The estimated population is 2,208,364 of both sex and of all ages.

From a statistical standpoint the total number of registrations must be looked upon as most satisfactory, they total 103,708. In each of the three classes there has been no abnormal change over 1904.

BIRTHS.

The net increase has been greater in the number of births registered during 1905, as compared with the other groups, making the rate per 1,000 of the estimated population, 23.5, as compared with 22.8 for 1904.

The apparent abnormal birth rate in Algoma and Nipissing, is due to the estimated population being much less than the actual number now inhabiting these districts, into which many settlers are going, while the figures clearly indicate the manner in which this new population is conforming to the law of registration.

MARRIAGES.

The marriage rate of 9.2 per thousand is 0.3 per thousand in excess of the previous year.

In considering the statistics in respect to marriages the continued increase in the returns from the County of Essex, is deserving of more than mere passing attention.

As compared with the general returns from the province, it will be seen that of the total increase over the year 1904, six hundred and thirty-seven (637), nearly one-half, or 316 were registered in Essex alone, which is 93 in excess of the return for the County of York, which includes the City of Toronto, for the same period.

It will further be observed that while the provincial marriage rate per thousand of the population is 9.2, that for Essex County is 32.2.

An analysis of the County of Essex shows that the marriage returns are classified as follows:—

Sandwich	318
Walkerville	48
Windsor	1,193
Remainder of County	287

of these, the Bride and Groom were classified as follows:—

	Bride and Groom both Americans.	Bride and Groom both Canadians.	Groom American. Bride Canadian.	Groom Canadian. Bride American.	Total.
Sandwich.....	266	31	12	9	318
Walkerville	24	18	4	2	48
Windsor.....	933	178	61	21	1,193
Essex (remainder of county).....	5	273	9	.....	278

A comparison made with Sarnia and Sault Ste. Marie, municipalities also adjacent to the State of Michigan, in the following table:—

	Bride and Groom American.	Bride and Groom Canadian.	Groom American. Bride Canadian.	Groom Canadian. Bride American.	Total.
Sarnia.....	56	112	12	10	190
Sault Ste. Marie.....	15	95	8	.....	118

If the comparison is extended still further to other border municipalities, not, however, contiguous to the State of Michigan, the contrast is more marked.

	Bride and Groom American.	Bride and Groom Canadian.	Groom American. Bride Canadian.	Groom Canadian. Bride American.	Total.
Brockville.....	7	103	5	5	120
Prescott	10	32	3	2	47
Rainy River.....	5	138	1	1	145
Niagara Falls.....	81	79	6	2	168

The foregoing figures clearly indicate the wholesale manner in which marriages are carried on, particularly at Sandwich and Windsor, and the great preponderance of marriages where both Bride and Groom are both residents of the United States is also most marked, the percentage being 83 in the former, and 78 in the latter of all marriages registered in the respective municipalities. Of the American couples married in the latter municipality, of the males 35, and the females 45, were divorcees.

A still further evidence of this wholesale traffic is found in the fact that in Sandwich, of the 318 marriages, 297 were performed by the same clergyman, six others dividing up the remaining 21 marriages. Of the witnesses, in the case of the two hundred and ninety-seven marriages, three members of the clergyman's family witnessed as follows:—One 163 times, a second 111 times, and the third, 75.

In Windsor the division of labor was greater, some 29 clergymen registering the total number of 1,193 weddings performed during the year,—one clergyman marrying 365 couples, another 225, three others registering 174, 137 and 106 each, the next in order having officiated at only 54 weddings. In the instance of the 365, a family compact in respect to witnesses apparently existed, the six members appearing as witnesses on 197, 89, 50, 10, 3 and 2 occasions respectively.

The contrast offered by the county of Essex in respect to marriages when compared to the province is still further emphasized when it is seen, while the average rate for Cities is 14.4. Windsor, which is the chief municipality in that county, shows a rate of no less than 91.5 per thousand.

Another practice which is becoming more common, and one to which issuers of marriage licenses should not lend themselves, is the providing of a room upon the premises of the issuer in which the marriage ceremony can be performed: and while there is no statutory provision prohibiting such an accommodation being made by the issuer, yet the very semblance of trafficking in what in this province is looked upon as both a civil and religious right should at all times be avoided.

I am of the opinion the law relating to the Solemnization of Marriage should be amended requiring in the case of both contracting parties being non-residents of the Province of Ontario, that one of the parties should have resided within the county for at least fifteen days, and this should be certified to by an affidavit from the householder in which said party was so domiciled, and on no account should a license be issued without the production of such an affidavit, said affidavit being forwarded to the Registrar-General. And the performance of the marriage ceremony at the office of the issuer should be absolutely prohibited. This would require but little alteration to the law, simply the striking out of the second part of subsec. (c) of sec. 17 of the Act respecting the Solemnization of Marriage, and in the second instance a short prohibitory course. In this manner the system of hasty marriages, to call it by a simple name, would be materially improved. certainly at present it is a blot on the good name of the province and a stigma to those trafficking therein.

DEATHS.

The death-rate, 14.2, approximated very closely that of 1904: the total number of deaths being only 81 in excess of number registered in that year.

The abnormal death-rate in Nipissing, which shows an increase of 138 registered deaths, is due to the same cause as that mentioned in the reference to births.

See Table No. 1—pp. 20 and 21.

STATISTICS OF CITIES.

In "table 2" will be found the returns for the (15) cities of the province, with an estimated population of 515,603 or 23.3 per cent. of the total

population of the province, who may be properly classed as urban. The most gratifying figures in the table are those relating to the number of births, for of the total increase in the province, 1,646, no less than 1,079 happened in the cities, it is only fair to say that some of these births might very rightly be credited to the rural districts, as in many cases the mothers seek the advantages offered by the hospitals as well as the privacy and seclusion of private institutions to be found in the centres of population.

The average death-rate for this "urban" group is 17.4 or 3.2 in excess of the provincial rate—the highest being in the City of Woodstock where the rate is 22.0. and the lowest, Stratford, where it is 12.2—while the rate for the City of Toronto, 17.6 was exceeded by Hamilton, Ottawa, Kingston, St. Catharines, Belleville, Chatham, Woodstock and Peterborough.

See Table No. 2—p. 22.

STATISTICS OF 32 TOWNS.

In this table will be found two municipalities with a population of over ten thousand, they appear here for the fact of their not having taken out incorporation as cities.

The figures of this group of urban municipalities, of what may be looked upon as the second class, the rate in each of the three classes is in excess of the provincial average, and a comparison with municipalities of the first class, shows that the birth-rate and marriage rate are exceeded, the mortality, however, being lower.

See Table No. 3—p. 23.

ILLEGITIMACY.

From a comparison of the figures as taken from the annual reports for the past seven years, it will be seen that so far as figures relating to this social question can indicate, there has been a steady decrease in the number of children born out of wedlock. In the year 1900, one out of every 55 of the children born during that year was illegitimate. Gradually, year by year, the proportion has been diminishing until, in 1905, only one out of every 74.2 was of that unfortunate class, as will be seen from the following figures:—

Year.	Illegitimate births.	Proportion of illegimates to every 100 children born.
1899.....	808	1.80
1900.....	800	1.73
1901.....	812	1.76
1902.....	819	1.72
1903.....	782	1.6
1904.....	798	1.58
1905.....	699	1.34

The comparison with other countries is most favorable, for the latest quinquennial periods return the illegitimate births to every 100 children born, being, as follows:—

Austria.....	14.55	Sweden.....	10.80	German Empire.....	9.21
Belgium.....	8.51	France.....	8.26	Prussia.....	7.84
Norway.....	7.35	Scotland.....	6.33	Italy.....	6.34
England.....	4.04	Ireland.....	2.65		

MULTIPLE BIRTHS.

Twins—during the same period, namely, for 1899, the figures have been respectively, 296, 401, 469, 523, 492, 549, and in 1905, 526.

Triplets—in the seven years, 1899-1905 inclusive, 29 births, in which triplets occurred, have been registered.

See Table No. 4—p. 24.

The proportion of male to female births show but an increase over the preceding year, the proportion being 100 female, to 105.9 male.

See Table No. 5—p. 24.

In continuance with former reports, the table of births by months, appears in the report. This table indicates the number of births by months of both the sexes.

See Table No. 6—p. 24.

MARRIAGES BY MONTHS AND QUARTERS.

The month of June maintains the lead as the most popular month for marriages, while the last quarter of the year is that in which the greatest number are registered. Those performed by Methodist clergymen represent 31.1 per cent. of the total registrations.

See Tables Nos. 7 and 8—p. 25.

DEATHS.

The death rate per thousand in the several counties of the province for the ten years, is set forth in Table 9, as also the average rate for the ten year.

The average rate for Carleton county is the highest for the decade, but it will be seen that the figures for the County of York are only 0.1 less than that of the former county, and while the rate for York, has, during the decade, increased, that for Carleton has shown but little variation.

The tables 10, 11 and 12 permit of a ready comparison of the deaths during 1905, by Classes of Diseases, as happening in the Province, the cities and the towns, as the sex, nativity, social condition, age groups and months—while a still further analysis of the deaths will be found in table 13, where the deaths are given by counties, according to ninety-eight individual diseases, classified in further groups of diseases, and similarly the deaths in the City group, (Table 14), the totals of which are included in the County group, (Table 13), are dealt with by individual diseases. The figures in Table 15, have reference only to the eleven largest towns in the Province.

See Tables Nos. 9-15 inclusive—pp. 26-37.

DEATHS BY OCCUPATIONS.

Two additional tables are presented giving the deaths by occupations, by age groups, and sex, so far as it is possible to collate these from the returns. It will be seen that of the total number registered, 31,370, only 19,142 appear in the table; the greater number of the 12,228 unclassified, is mainly composed of married women, infants, and those under 15 years of age, who would not be expected to have an occupation. A similar explanation is offered in respect to the figures in Table 17.

See Tables Nos. 16 and 17—pp. 37-43.

DEPARTMENTAL WORK AND THE COLLECTED RECORDS.

Since the inauguration of the collection and elaboration of the births, deaths and marriages in the year 1869, there has been gathered together a most comprehensive register.

Beginning July 1st, 1869, there have been returned to the office of the Registrar-General, by the Division-Registrars of the province, a total of 2,797,108 registrations of either births, marriages or deaths, happening during the thirty-six and one-half years the Act has been in operation. The details of these returns are fully set forth in the following table.

TABLE SHOWING NUMBER OF BIRTHS, MARRIAGES AND DEATHS IN PROVINCE OF ONTARIO FOR THIRTY-SIX YEARS, 1869-1905 INCLUSIVE.

Year.	Births.	Marriages.	Deaths.	Census population.
1869	8,416 *	2,934 *	2,776 *	
1870	19,536	8,668	6,905	
1871	24,830	9,939	9,182	1,620,851
1872	23,367	10,450	10,745	
1873	27,552	10,998	11,069	
1874	28,273	10,925	10,352	
1875	25,984	10,282	9,532	
1876	38,479	12,550	18,623	
1877	39,957	12,577	20,053	
1878	40,236	12,729	17,808	
1879	41,035	12,509	17,958	
1880	42,312	12,783	19,802	
1881	40,714	13,106	22,821	1,923,228
1882	42,429	13,449	21,800	
1883	42,981	14,277	21,049	
1884	44,504	13,646	21,702	
1885	45,228	13,675	22,105	
1886	46,458	13,845	23,184	
1887	45,904	14,460	23,414	
1888	46,953	14,551	23,734	
1889	48,538	14,880	23,329	
1890	47,773	14,463	24,013	
1891	44,754	14,189	21,558	2,114,321
1892	42,176	14,482	23,120	
1893	42,894	14,475	22,903	
1894	42,051	14,341	22,538	
1895	41,628	13,987	22,461	
1896	46,908	14,904	24,857	
1897	47,323	15,293	27,633	
1898	46,599	15,375	26,370	
1899	44,705	16,514	28,607	
1900	46,127	17,107	29,494	
1901	46,061	18,035	29,608	2,182,947
1902	47,796	18,072	27,864	
1903	48,642	19,830	29,664	
1904	50,265	19,789	31,290	
1905	51,911	20,426	31,371	
	1,501,299	514,515	781,294	

* 6 Months.

The value of these records cannot be estimated, and only as time goes by will the public appreciate these records, thus safely preserved. It is a work which is unique in the Dominion of Canada, if not upon this continent. It is an instance of the usefulness of centralization, for in no other manner could such records, either be of value to the province or of public usefulness.

As the value of the registrations depends very largely upon their completeness, a comparison of the returns of the census years, beginning with that of 1871, will indicate the improvement in each of the three groups of returns, and the manner in which registrations have been made since 1881 when apparently a normal standard was reached, has apparently kept pace with population increase.

It is not claimed these returns are complete—for in many instances it is found births are not reported, the neglect arising from one of several causes, viz.: (a) the physician fails to notify of birth, leaving the responsibility upon the parents; (b) the parents fail to register under the false impression, it is the duty of the medical attendant; (c) where midwives are employed they often ignore the law; (d) many who observe the religious rite of infant baptism labor under the false impression that the clergyman will report to the authorities; and, lastly, (e) a small percentage of illegitimates are unregistered.

In the case of the marriages and deaths, the percentage of non-registrations is much less, and any deficiency in respect to the former will be checked by the recently adopted system, whereby clergymen return to the department the endorsed marriage license, or the notification of publication of banns, and the issuer of marriage licenses in a similar manner remits the affidavit, upon which each license is issued. While it is hoped by a closer scrutiny of the cemetery returns, to keep a closer check on unregistered deaths.

In addition to the registrations collected by the department since July 1st, 1869, the marriage registers in the hands of District Registrars previous to the year 1858 have been collected by the department and are now on file; in one instance the marriages date from the year 1816, and although these returns are incomplete, yet their importance and value as years pass by, becomes greatly enhanced. The extent of these marriage returns is shown in the following table:—

<i>Districts.</i>	<i>Years.</i>
Bathurst	1831 to 1852
Brock	1839 — 1857
Gore	1843 — 1855
Home	1831 — 1856
Ottawa	1816 — 1853
Simcoe	1842 — 1858
Talbot	1838 — 1868
Hastings County	1839 — 1858
Huron County	1841 — 1848
Middlesex County	1833 — 1855
Northumberland and Durham	1839 — 1858

From 1858-1869, marriage records were kept by County Registrars, these records are now in the vaults of the office and are as follows:—

REGISTRATION OF MARRIAGES BY COUNTIES FROM 1858 TO 1869.

Brant.	Grey.
Bruce.	Haldimand.
Carleton.	Halton.
Elgin.	Hastings.
Essex.	Huron.
Frontenac.	Kent.

REGISTRATION OF MARRIAGES—*Continued.*

Lambton.	Peterborough.
Lanark.	Prescott & Russell.
Leeds and Grenville.	Prince Edward.
Lennox and Addington.	Renfrew.
Lincoln.	Simcoe.
Middlesex.	Stormont, Dundas and Glengarry.
Norfolk.	Victoria.
Northumberland and Durham.	Waterloo.
Ontario.	Welland.
Oxford.	Wellington.
Peel.	Wentworth.
Perth.	York.

The returns thus collected do not complete the registers which may be found in the hands of various clergymen or religious denominations in Ontario, which, if they could be secured, would be of great value, whereas in their present scattered condition are next to worthless. I need hardly add in conclusion, that these originals would be gladly received, and would find a permanent place of safe-keeping in the vaults of the department. As an example, it may be stated the marriage registers of the following clergymen have been placed in the keeping of the Registrar-General:

Rev. Jas. Harris, Knox Church, Toronto, from 1823-1838.
 Rev. Wm. Fraser, North Gwillimbury, from 1835-1892.

The accompanying table shows the county distribution of Division-Registrars who are collecting locally the vital statistics of the province, and to whose energy the completeness of the returns of the department is mainly due, and who in the past have rendered invaluable assistance, receiving in return for their services, the small statutory fee of twenty cents for each registration made to the Registrar-General. Without the aid given by these officers, the work of the central registration office would be of little use.

The following is a summary of the table showing the municipal classification of these Division-Registrars.

Cities	16
Towns	93
Villages (incorporated)	142
Townships	565
Unorganized Districts	26
Total	842

TABLE showing County Distribution of Division Registrars in Ontario.

Counties and Estimated Population (including Cities).		Cities and Estimated Population.	Number of Towns.	Number of Villages.	Number of Townships.	Total Municipalities.
Algoma	45,895		8		*48	56
Brant	38,533	Brantford	18,476	1	6	8
Bruce	59,675		4	7	16	27
Carleton	97,980	Ottawa	67,716	3	10	14
Dufferin	21,270		1	1	7	9
Elgin	44,069	St. Thomas	11,966	3	9	13
Essex	59,165	Windsor	12,973	4	15	23
Frontenac	45,029	Kingston	18,171	1	16	18
Grey	70,361		3	5	16	24
Haldimand	21,470			4	10	14
Haliburton	19,761				10	10
Halton	6,631		2	3	4	9
Hastings	59,948	Belleville	9,220	1	6	†18
Huron	62,506		2	8	16	26
Kent	58,060	Chatham	9,075	7	10	18
Lambton	57,270		3	6	13	22
Lanark	37,645		4	1	13	18
Leeds and Grenville	59,651		2	6	17	25
Lennox and Addington	23,605		1	2	10	13
Lincoln	30,891	St. Catharines	10,275	1	4	8
Middlesex	93,731	London	40,687	4	19	24
Muskoka	21,204		1	3	§16	20
Nipissing	27,037		8		||29	37
Norfolk	29,470		1	4	8	13
Northumberland & Durham	62,737		3	6	16	25
Ontario	40,857		3	3	10	16
Oxford	48,932	Woodstock	8,923	1	3	12
Parry Sound	25,213		2	1	†29	32
Peel	21,713		1	2	5	8
Perth	50,424	Stratford	10,148	2	11	16
Peterborough	36,466	Peterboro'	11,913	2	13	16
Prescott and Russell	47,842		3	2	11	16
Prince Edward	18,062		1	1	7	9
Rainy River	16,623		3		**18	21
Renfrew	53,296		3	2	24	29
Simcoe	83,229		5	7	15	27
Stormont, Dundas and Glengarry	69,694		1	6	13	20
Thunder Bay	12,685		4		††4	8
Victoria	32,306		1	2	13	16
Waterloo	53,176		4	4	5	13
Welland	31,938		2	4	8	15
Wellington	56,262	Guelph	11,904	2	7	12
Wentworth	80,333	Hamilton	54,305	1	8	11
York	275,689	Toronto	219,851	4	6	13
Totals	2,208,364	515,603	93	142	591	842

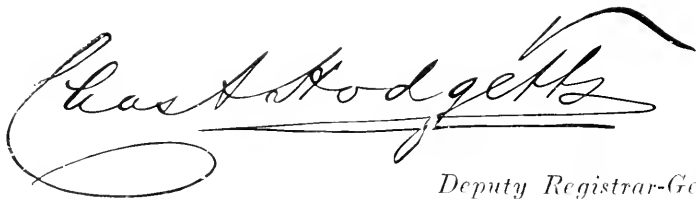
* 9 Unorganized. † 1 Unorganized. § 3 Unorganized townships. || 6 Unorganized townships. ** 1 Unorganized.

†† 4 Unorganized.

The character of the work of the department in its tediousness and the close attention to detail required to secure accuracy in the tables, is too often forgotten, and I take this opportunity of testifying to the painstaking work of the Chief Clerk and staff. They have been ever ready to render every assistance, in not only all matters of office routine, but in the compilation of any special tables or reports, and to their ready and willing help this testimony is cheerfully given.

In conclusion, I beg to append for the use of physicians, the classification of causes of deaths (Bertillon Classification), which was adopted as the international system some years ago, and is given for their guidance in making returns of deaths, and it is earnestly hoped the classification will be used by them.

All of which is respectfully submitted.

A large, elegant handwritten signature in cursive script, reading "Chas. A. Hodges". The signature is written in dark ink and features a prominent, sweeping flourish that extends from the end of the name back towards the beginning.

Deputy Registrar-General.

APPENDIX.

COMPARISON OF THE ABRIDGED AND DETAILED FORMS OF THE INTERNATIONAL CLASSIFICATION OF CAUSES OF DEATH.

The *Abridged Classification* is that used by the Department in the preparation of certain tables, beginning with the Report for the year 1906; and all reference numbers in parenthesis or brackets are to those of the Detailed Classification and show the exact titles corresponding to of the abridged or shorter list.

The *Detailed Classification* is the International Classification (Bertillon of death).

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Abridged Classification.

Detailed Classification.

ALL CAUSES (STILL BIRTHS INCLUDED.)

ALL CAUSES (STILL BIRTHS EXCLUDED.)

I.—GENERAL DISEASES.

I.—GENERAL DISEASES.

(A. *Epidemic Diseases.*)

(A. *Epidemic Diseases.*)

1. Typhoid fever (1).
2. Malarial fever (4).
3. Smallpox (5).
4. Measles (6).
5. Scarlet Fever (7).
6. Whooping Cough (8).
7. Diphtheria and Croup (9).
8. Influenza (10).
9. Dysentery (14).
10. Erysipelas (18).
11. Other epidemic diseases (2, 3, 11, 15, 16, 17, 19).

(B. *Other general diseases.*)

12. Septicæmia (20).
13. Tuberculosis of lungs (27).
14. Tuberculosis of larynx (26).
15. Tuberculous meningitis (28).
16. Abdominal tuberculosis (29).
17. Pott's Disease (30).
18. Tuberculous abscess (31).
19. White swelling (32).
20. Tuberculosis of other organs (33).
21. General tuberculosis (34).
22. Scrofula (35).

1. Typhoid fever (abdominal typhus).
2. Exanthematic typhus.
3. Relapsing fever.
4. Intermittent fever & malarial cachexia.
4. *Repeated. Malarial cachexia.*
5. Smallpox.
6. Measles.
7. Scarlet fever.
8. Whooping cough.
9. Diphtheria and croup.
9. *Repeated. Diphtheria.*
10. Influenza.
11. Miliary fever.
12. Asiatic cholera.
13. Cholera nostras.
14. Dysentery.
14. *Repeated. Epidemic dysentery.*
15. Bubonic plague.
16. Yellow fever.
17. Leprosy.
18. Erysipelas.
19. Other epidemic diseases.

(B. *Other general diseases.*)

20. Purulent infection and septicæmia
21. Glanders and farcy.
22. Malignant pustule.
23. Rabies.
24. Actinomycosis, trichinosis, etc.
25. Pellagra.
27. Tuberculosis of the lungs.
26. Tuberculosis of the larynx.
28. Tuberculosis of the meninges.
29. Abdominal tuberculosis.
30. Pott's disease.
31. Cold abscess, abscess by congestion.
32. White swelling.
33. Tuberculosis of other organs.
34. General tuberculosis.
35. Scrofula.

FORMS OF THE INTERNATIONAL CLASSIFICATION OF CAUSES OF DEATH.—*Continued.*

Abridged Classification.	Detailed Classification.
<p>23. Venereal diseases (36, 37, 38).</p> <p>24. Cancer of mouth (39).</p> <p>25. Cancer of stomach and liver (40).</p> <p>26. Cancer of intestines (41).</p> <p>27. Cancer of genital organs (42).</p> <p>28. Cancer of breast (43).</p> <p>29. Cancer of skin (44).</p> <p>30. Cancer of other or unspecified organs (45).</p> <p>31. Tumors (46).</p> <p>32. Rheumatism (47, 48).</p> <p>33. Diabetes (50).</p> <p>34. Anæmia, leukæmia (53, 54).</p> <p>35. Alcoholism (56).</p> <p>36. Chronic poisonings (57, 58, 59).</p> <p>37. Other general diseases (21, 22, 23, 24, 25, 49, 51, 52, 55).</p>	<p>{ 36. Syphilis.</p> <p>{ 37. Gonorrhœa (5 years and over).</p> <p>{ 38. Gonorrhœa (under 5 years).</p> <p>39. Cancer and other malignant tumors of the buccal cavity.</p> <p>40. Cancer and other malignant tumors of the stomach and liver.</p> <p>41. Cancer and other malignant tumors of the peritoneum, intestines & rectum.</p> <p>42. Cancer and other malignant tumors of the female genital organs.</p> <p>43. Cancer and other malignant tumors of the breast.</p> <p>44. Cancer and other malignant tumors of the skin.</p> <p>45. Cancer and other malignant tumors of other organs or of organs not specified.</p> <p>46. Other tumors (tumors of the female genital organs excepted).</p> <p>{ 47. Acute articular rheumatism.</p> <p>{ 48. Chronic rheumatism and gout.</p> <p>49. Scurvy.</p> <p>50. Diabetes.</p> <p>51. Exophthalmic goitre.</p> <p>52. Addison's disease.</p> <p>{ 53. Leukæmia.</p> <p>{ 54. Anæmia, chlorosis.</p> <p>56. Acute and chronic alcoholism.</p> <p>{ 57. Chronic lead poisoning.</p> <p>{ 58. Other chronic poisonings (occupational).</p> <p>{ 59. Other chronic poisonings.</p> <p>55. Other general diseases.</p>
II.—DISEASES OF NERVOUS SYSTEM.	II. DISEASES OF THE NERVOUS SYSTEM AND OF THE ORGANS OF SPECIAL SENSE.
<p>38. Encephalitis (60).</p> <p>39. Meningitis (61).</p> <p>40. Locomotor ataxia (62).</p> <p>41. Other diseases of spinal cord (63).</p> <p>42. Apoplexy (64).</p> <p>43. Softening of brain (65).</p> <p>44. Paralysis (66).</p> <p>45. General paralysis of insane (67).</p> <p>46. Other forms of mental disease (68).</p> <p>47. Other diseases of brain (74).</p> <p>48. Epilepsy (69).</p> <p>49. Convulsions (70, 71).</p> <p>50. Tetanus (72).</p> <p>51. Other diseases of the nervous system (73, 74, 75, 76).</p>	<p>60. Encephalitis.</p> <p>61. Simple meningitis.</p> <p>61. <i>Repeated.</i> (<i>Epidemic cerebro-spinal meningitis</i>).</p> <p>62. Progressive locomotor ataxia.</p> <p>63. Other diseases of the spinal cord.</p> <p>64. Congestion and hemorrhage of the brain.</p> <p>65. Softening of the brain.</p> <p>66. Paralysis without specified cause.</p> <p>67. General paralysis.</p> <p>68. Other forms of mental alienation.</p> <p>69. Epilepsy.</p> <p>{ 70. Convulsions (non-puerperal), 5 years and over).</p> <p>{ 71. Convulsions (under 5 years).</p> <p>72. Tetanus.</p> <p>{ 73. Chorea.</p> <p>{ 74. Other diseases of the nervous system.</p> <p>{ 75. Diseases of the eye and its adnexa.</p> <p>{ 76. Diseases of the ear.</p>

FORMS OF THE INTERNATIONAL CLASSIFICATION OF CAUSES OF DEATH.—*Continued.*

Abridged Classification.

III.—DISEASES OF CIRCULATORY SYSTEM.

- 52. Pericarditis (77).
- 53. Endocarditis (78).
- 54. Heart disease (79).
- 55. Angina pectoris (80).
- 56. Diseases of arteries (81).
- 57. Embolism and thrombosis (82).
- 58. Diseases of veins (83).
- 59. Diseases of lymphatics (84).
- 60. Other diseases of circulatory system (85, 86).

IV.—DISEASES OF RESPIRATORY SYSTEM.

- 61. Diseases of larynx (88).
- 62. Diseases of the thyroid body (89).
- 63. Acute bronchitis (90).
- 64. Chronic bronchitis (91).
- 65. Broncho-pneumonia (92).
- 66. Pneumonia (93).
- 67. Pleurisy (94).
- 68. Congestion of lungs (95).
- 69. Gangrene of lungs (96).
- 70. Asthma and emphysema (97-98).
- 71. Hemorrhage of lungs (99).
- 72. Other diseases of respiratory system phthisis excepted (87, 99).

V.—DISEASES OF DIGESTIVE SYSTEM.

- 73. Diseases of mouth (100).
- 74. Tonsillitis (101).
- 75. Other diseases of pharynx (101, 102).
- 76. Ulcer of stomach (103).
- 77. Gastritis.
- 78. Other diseases of the stomach. } (104).
- 79. Dentition.
- 80. Diarrhoea and enteritis (under 2 years) (105).
- 81. Diarrhoea and enteritis (2 years and over) (106).
- 82. Hernia
- 83. Obstruction of intestines } (108).
- 84. Other diseases of intestines (107, 109).
- 85. Acute yellow atrophy of liver (110).
- 86. Hydatid tumors of liver (111).
- 87. Cirrhosis of liver (112).
- 88. Biliary calculi (113).
- 89. Other diseases of liver (114).
- 90. Diseases of spleen (115).
- 91. Peritonitis, non-puerperal (116).

2* R.G.

Detailed Classification.

III.—DISEASES OF THE CIRCULATORY SYSTEM.

- 77. Pericarditis.
- 78. Acute endocarditis.
- 79. Organic diseases of the heart.
- 80. Angina pectoris.
- 81. Diseases of the arteries, atheroma, aneurism, etc.
- 82. Embolism and thrombosis.
- 83. Diseases of the veins (varices, hemorrhoids, phlebitis, etc.).
- 84. Diseases of the lymphatic system (lymphangitis, etc.)
- { 85. Hemorrhages.
- { 86. Other diseases of the circulatory system.

IV.—DISEASES OF THE RESPIRATORY SYSTEM.

- 87. Diseases of the nasal fossae.
- 88. Diseases of the larynx.
- 89. Diseases of the thyroid body.
- 90. Acute bronchitis.
- 91. Chronic bronchitis.
- 92. Broncho-pneumonia.
- 93. Pneumonia.
- 94. Pleurisy.
- 95. Congestion and apoplexy of the lungs.
- 96. Gangrene of the lungs.
- { 97. Asthma.
- { 98. Pulmonary emphysema.
- 99. Other diseases of the respiratory system (phthisis excepted).

V.—DISEASES OF THE DIGESTIVE SYSTEM.

- 100. Diseases of the mouth and its adnexa.
- { 101. Diseases of the pharynx.
- { 102. Diseases of the oesophagus.
- 103. Ulcer of the stomach.
- 104. Other diseases of the stomach (cancer excepted).
- 105. Diarrhoea and enteritis (under 2 years).
- 105. Repeated. Chronic diarrhoea and enteritis (under 2 years).
- 106. Diarrhoea and enteritis (2 years and over).
- 107. Intestinal parasites.
- 108. Hernia and intestinal obstructions.
- 109. Other diseases of the intestines.
- 110. Acute yellow atrophy of the liver.
- 111. Hydatid tumors of the liver.
- 112. Cirrhosis of the liver.
- 113. Biliary calculi.
- 114. Other diseases of the liver.
- 115. Diseases of the spleen.
- 116. Simple peritonitis (non-puerperal).

FORMS OF THE INTERNATIONAL CLASSIFICATION OF CAUSES OF DEATH.—*Continued.*

Abridged Classification.	Detailed Classification.
92. Appendicitis (118). 93. Other diseases of the digestive system (cancer and tuberculosis excepted) (117).	118. Appendicitis and abscess of the iliac fossa. 117. Other diseases of the digestive system (cancer and tuberculosis excepted).
VI.—DISEASES OF GENITO-URINARY SYSTEM.	VI.—DISEASES OF THE GENITO-URINARY SYSTEM AND ITS ADNEXA.
94. Acute nephritis (119). 95. Bright's disease (120). 96. Other diseases of kidneys (121). 97. Calculi of urinary tract (122). 98. Diseases of bladder (123).	119. Acute nephritis. 120. Bright's disease. 121. Other diseases of the kidneys and their adnexa. 122. Calculi of the urinary tract. 123. Diseases of the bladder. 124. Diseases of the urethra, urinary abscess, etc. 125. Diseases of the prostate.
99. Diseases of male genital organs (non-venereal) (126).	126. Non-venereal diseases of the male genital organs.
100. Uterine tumor (129). 101. Other diseases of uterus (127, 128, 130). 102. Ovarian tumor (131). 103. Diseases of the tubes (132). 104. Diseases of female genital organs (non-venereal) (132). 105. Other diseases of the genito-urinary system (124, 125, 126, 132, 133).	127. Metritis. 128. Uterine hemorrhage (non-puerperal). 129. Uterine tumor (non-cancerous). 130. Other diseases of the uterus 131. Cysts and other tumors of the ovary. 132. Other diseases of the female genital organs 133. Non-puerperal diseases of the breast (cancer excepted).
*VII.—THE PUERPERAL STATE.	VII.—THE PUERPERAL STATE.
106. Puerperal septicemia (137). 107. Puerperal convulsions (138). 108. Other causes incident to child-birth (134, 135, 136, 139, 140, 141).	134. Accidents of pregnancy. 135. Puerperal hemorrhage. 136. Other accidents of labor. 137. Puerperal septicemia. 138. Puerperal albuminuria & convulsions. 139. Phlegmasia alba dolens (puerperal). 140. Other puerperal accidents — sudden death. 141. Puerperal diseases of the breast.
VIII.—DISEASES OF SKIN.	VIII.—DISEASES OF THE SKIN AND CELLULAR TISSUE.
109. Gangrene (142). 110. Carbuncle (143). 111. Abscess (144). 112. Other diseases of skin (145).	142. Gangrene. 143. Furuncle. 144. Acute abscess, phlegmon. 145. Other diseases of the skin and its adnexa.
IX.—DISEASES OF LOCOMOTOR SYSTEM.	IX.—DISEASES OF THE ORGANS OF LOCOMOTION.
113. Diseases of the bones (146). 114. Diseases of the joints (147).	146. Nontuberculous diseases of the bones. 147. Arthritis and other diseases of the joints (tuberculosis and rheumatism excepted).

* The distinction between puerperal and non-puerperal diseases should be carefully maintained. Whenever the death of a female of child bearing age is reported from any disease which may have been puerperal, the medical attendant should state whether or not it was puerperal.

FORMS OF THE INTERNATIONAL CLASSIFICATION OF CAUSES OF DEATHS.--*Concluded.*

Abridged Classification.	Detailed Classification.
115. Other diseases of locomotor system (148, 149).	{ 148. Amputation. 149. Other diseases of the organs of locomotion.
X.—MALFORMATIONS.	X.—MALFORMATIONS.
116. Congenital malformations (still-births excluded) (150).	150. Congenital malformations (stillbirths excluded).
XI.—EARLY INFANCY.	XI.—EARLY INFANCY.
117. Premature birth (151). 118. Congenital debility (151, 152, 153).	{ 151. Congenital debility, icterus and sclerema. 152. Other diseases peculiar to early infancy. 153. Lack of care.
XII.—OLD AGE.	XII.—OLD AGE.
119. Old age (154).	154. Senile debility.
XIII.—VIOLENCE AND OTHER EXTERNAL CAUSES.	XIII.—EXTERNAL CAUSES.
120. Suicides (155-163) inclusive.	{ 155. Suicide by poison. 156. Suicide by asphyxia. 157. Suicide by hanging or strangulation. 158. Suicide by drowning. 159. Suicide by firearms. 160. Suicide by cutting instruments. 161. Suicide by jumping from high places. 162. Suicide by crushing. 163. Other suicides. 164. Fractures. 165. Dislocations. 166. Burns and Scalds. 167. Burns from corrosive substances. 168. Sunstroke. 169. Freezing. 170. Electric shock (including lightning). 171. Accidental drowning. 172. Inanition (starvation). 173. Absorption of deleterious gases (non-suicidal). 174. Other acute poisonings. 175. Other accidental traumatism. 176. Other external violence.
121. Fractures and dislocations (164, 165).	
122. Burns and scalds (167).	
123. Physical phenomena (169, 170, 171).	
124. Drowning (172).	
125. Inhalation of poisonous gases (174).	
126. Other accidental poisonings (175).	
127. Other accidental traumatism (166).	
128. Injuries at birth } (176).	
129. Homicide	
XIV.—ILL-DEFINED DISEASES.	XIV.—ILL-DEFINED DISEASES.
{ 130. Dropsy (177). 131. Heart failure (179). 132. Other ill-defined causes (178, 179). 133. Unknown causes (179).	{ 177. Dropsy. 178. Sudden death. 179. Causes of death unspecified or ill-defined.
134. XV.—STILL BIRTHS.	

TABLE NO. 1.

Table showing the total number of Births, Marriages and Deaths in each County in 1905.

Counties.	Population.	Births.			Marriages.			Deaths.			Totals.			Ratio to 1,000 of the population.		
		Number in 1905.	Variation from 1904.		Number in 1905.	Variation from 1904.		Number in 1905.	Variation from 1904.		Number in 1905.	Increase, Decrease.		Births.	Marriages.	Deaths.
			Increase.	Decrease.		Increase.	Decrease.		Increase.	Decrease.		Increase.	Decrease.			
Algoma.....	45,895	1,325	84	.....	464	63	.....	620	79	.....	2,609	226	.....	33.2	10.1	13.5
Brant.....	798,563	859	78	.....	314	43	.....	498	.....	15	1,671	106	.....	22.2	8.0	12.9
Bruce.....	159,675	1,268	.....	32	389	.....	28	742	7	.....	2,399	.....	53	21.2	6.5	12.4
Carleton.....	97,980	2,433	152	.....	939	108	.....	1,734	107	.....	5,106	367	.....	21.8	9.5	17.6
Dufferin.....	21,270	435	.....	18	141	.....	19	263	.....	63	839	.....	43	20.4	6.6	12.3
Elgin.....	44,069	786	1	.....	369	16	.....	489	.....	97	1,644	.....	80	12.8	8.3	11.0
Essex.....	59,165	1,615	13	.....	1,911	316	.....	727	.....	57	4,253	272	.....	27.2	32.2	12.2
Frontenac.....	45,029	878	.....	21	324	.....	25	643	3	.....	1,845	.....	43	19.4	7.1	14.2
Grey.....	70,361	1,512	.....	7	512	.....	4	885	5	.....	2,939	.....	6	21.4	7.7	12.5
Haldimand.....	21,470	388	.....	32	182	.....	7	245	.....	21	815	.....	60	18.0	8.1	11.4
Hatton.....	19,761	448	41	.....	147	13	.....	264	.....	9	859	45	.....	22.6	7.4	13.3
Hatiburton.....	6,631	203	.....	30	27	.....	23	74	.....	7	304	.....	60	30.6	4.0	11.1
Hastings.....	59,948	1,148	.....	81	466	5	.....	730	2	.....	2,341	.....	74	19.1	7.7	12.1
Huron.....	62,506	1,151	30	.....	429	1	.....	692	.....	18	2,272	13	.....	18.4	6.8	11.0
Kent.....	58,060	1,191	17	.....	403	.....	50	746	4	.....	2,340	.....	29	20.5	6.9	12.8

Lambton	57,270	1,194	58	.....	485	6	.....	742	38	.....	2,421	102	.....	20.8	8.4	12.6
Lanark	37,645	682	.....	33	260	.....	14	516	6	.....	1,458	.....	41	18.1	6.9	13.7
Leeds and Grenville	59,651	1,118	.....	22	449	.....	3	892	.....	14	2,459	.....	39	18.7	7.5	14.9
Lennox and Addington	23,605	431	21	.....	180	.....	6	289	26	.....	900	41	.....	18.2	7.6	12.2
Lincoln	30,891	680	113	.....	237	5	.....	472	.....	16	1,389	102	.....	22.0	7.6	15.2
Middlesex	93,731	1,839	.....	78	799	.....	5	1,357	.....	70	3,995	.....	153	18.1	8.5	14.4
Muskoka	21,204	633	.....	10	172	.....	11	334	53	.....	1,139	32	.....	29.8	8.1	15.7
Nipissing	27,037	1,608	287	.....	312	53	.....	640	138	.....	2,560	478	.....	59.4	11.5	23.6
Norfolk	29,470	579	.....	12	212	.....	1	366	.....	55	1,157	.....	68	19.6	7.2	12.4
Northumberland and Durham	62,737	1,121	.....	48	453	.....	1	816	.....	26	2,390	.....	75	17.8	7.2	13.0
Ontario	40,837	798	.....	160	262	.....	28	499	.....	27	1,559	.....	215	19.5	6.4	12.2
Oxford	48,932	1,001	25	.....	370	8	.....	726	12	.....	2,097	45	.....	20.4	7.5	14.8
Parry Sound	25,213	657	.....	114	171	15	.....	299	.....	12	1,127	.....	111	26.0	6.7	11.8
Peel	21,713	377	49	.....	144	.....	21	306	18	.....	827	46	.....	17.3	6.6	14.0
Perth	50,424	1,033	.....	1	406	20	.....	526	.....	21	1,965	.....	5	20.4	8.0	10.4
Peterboro	36,466	850	.....	41	319	.....	18	489	.....	63	1,658	.....	122	23.3	8.7	13.4
Prescott and Russell	47,812	1,950	175	.....	375	17	.....	758	54	.....	3,083	246	.....	40.7	7.8	15.8
Prince Edward	18,062	296	26	.....	131	7	.....	243	12	.....	670	45	.....	16.3	7.2	13.4
Rainy River	16,623	356	13	.....	132	21	.....	187	7	.....	675	41	.....	21.4	7.9	11.2
Renfrew	53,296	1,508	43	.....	382	.....	18	726	82	.....	2,616	107	.....	28.2	7.1	13.6
Simcoe	83,229	1,986	49	.....	660	.....	.....	1,118	61	.....	3,764	110	.....	23.8	7.9	13.4
Stormont, Dundas and Glen- garry	69,694	1,531	.....	50	485	15	.....	912	.....	40	2,928	.....	75	21.9	6.9	13.0
Thunder Bay	12,685	501	8	.....	196	.....	2	267	.....	62	964	.....	56	39.4	15.4	21.0
Victoria	32,306	685	37	.....	218	.....	83	393	2	.....	1,296	.....	44	21.2	6.7	12.1
Waterloo	53,176	1,327	137	.....	422	.....	29	635	22	.....	2,381	130	.....	24.9	7.9	11.9
Welland	31,938	728	67	.....	369	15	.....	499	.....	3	1,596	79	.....	22.7	11.5	15.6
Wellington	56,262	1,065	.....	21	407	.....	5	701	.....	54	2,173	.....	80	18.9	7.2	12.4
Wentworth	80,333	1,965	213	.....	840	68	.....	1,318	.....	23	4,123	258	.....	24.4	10.4	16.4
York	275,689	7,572	720	.....	3,531	223	.....	4,993	62	.....	16,096	1,005	.....	27.4	12.8	18.1
Totals	2,208,364	51,911	2,457	811	20,426	1,038	401	31,371	800	719	103,708	3,806	1,532	23.5	9.2	14.2

TABLE NO. 2.

Table showing the total number of Births, Marriages and Deaths in each City in 1905.

Cities.	Births.			Marriages.			Deaths.			Totals.			Ratio to 1,000 of Population.		
	Number in 1905.	Increase.	Variation from 1904.	Number in 1905.	Increase.	Variation from 1904.	Number in 1905.	Increase.	Variation from 1904.	Number in 1905.	Increase.	Variation from 1904.	Births.	Marriages.	Deaths.
Toronto.....	219,851	5,826	540	3,065	198	.....	3,887	1	.....	12,778	739	.....	26.4	13.9	17.6
Hamilton.....	54,395	1,374	169	678	79	.....	963	35	.....	3,015	283	.....	25.3	12.4	17.7
Ottawa.....	67,716	1,791	194	666	78	.....	1,232	.....	2	3,689	270	.....	26.4	9.8	18.1
London.....	40,687	879	61	480	23	.....	652	.....	38	2,011	.....	79	21.6	11.7	16.0
Kingston.....	18,176	138	48	164	.....	23	366	6	.....	968	31	.....	24.1	9.0	20.1
Brantford.....	18,176	482	53	186	35	.....	256	.....	17	924	71	.....	26.0	10.0	13.8
St. Thomas.....	11,966	267	32	158	24	.....	168	.....	5	593	51	.....	22.3	13.2	14.0
Guelph.....	11,901	275	5	125	6	.....	155	.....	14	555	.....	3	23.1	10.5	13.0
St. Catharines.....	10,275	261	68	101	.....	4	207	8	.....	569	72	.....	25.1	9.8	20.1
Belleville.....	9,220	117	20	114	24	.....	169	.....	4	430	.....	.....	15.9	12.3	18.3
Stratford.....	10,148	222	11	130	21	.....	124	8	.....	476	18	.....	21.8	12.8	12.2
Windsor.....	12,973	365	15	1,188	195	.....	193	.....	2	1,686	208	.....	23.5	91.5	14.8
Chatham.....	9,075	166	10	106	.....	41	184	28	.....	456	.....	3	18.2	11.6	20.2
Woodstock.....	8,923	202	43	122	50	.....	197	7	.....	521	100	.....	22.6	13.6	22.0
Peterborough.....	11,913	350	3	180	.....	19	225	.....	22	755	.....	44	29.3	15.1	18.8
Total.....	515,603	12,985	1,177	7,463	733	87	8,978	93	104	29,426	1,843	129	25.1	14.4	17.4

TABLE NO. 3.

Table showing the total number of Births, Marriages and Deaths in Principal Towns of over 3,000 population during 1905.

Towns.	Population.	Births.		Marriages.		Deaths.		Totals.		Ratio to 1,000 of Population.	
		Variation from 1904.		Variation from 1904.		Variation from 1904.		Variation from 1904.			
		Increase.	Decrease.	Increase.	Decrease.	Increase.	Decrease.	Increase.	Decrease.	Births.	Deaths.
		Number in 1905.	Number in 1904.	Number in 1905.	Number in 1904.	Number in 1905.	Number in 1904.	Number in 1905.	Number in 1904.		
Amphior.	4,529	136	11	46	4	55	3	257	18	30.0	12.1
Barrie	6,116	144	34	103	22	99	8	316	61	23.5	16.1
Berlin	10,868	315	70	111	5	162	28	591	93	28.9	14.9
Brockville	9,000	221	9	102	1	132	22	515	13	24.5	11.3
Carleton Place.	4,165	99	11	38	26	87	11	185	10	24.1	11.6
Collingwood	6,118	165	15	75	3	87	11	327	3	26.9	12.5
Cobourg	4,287	88	10	42	3	88	10	218	23	20.5	9.8
Cornwall	6,780	147	13	58	15	126	7	331	35	21.6	8.5
Fort William.	1,947	259	41	78	2	119	15	417	14	61.7	23.4
Galt	8,008	151	5	86	2	112	11	352	3	19.2	13.9
Goderich.	4,283	79	27	27	6	55	9	161	3	18.7	7.2
Ingersoll	4,769	118	25	57	7	94	3	219	14	24.7	10.7
Kenora	7,915	43	15	57	49	117	18	230	56	14.7	7.2
Lindsay	7,408	137	15	72	2	117	3	326	6	18.4	9.7
Napanee	3,179	48	23	17	4	105	3	144	31	28.3	10.6
Niagara Falls.	4,665	179	94	68	21	60	9	322	40	18.8	13.6
Oshawa	4,973	94	7	58	7	60	11	343	42	26.0	12.0
Orillia	4,532	118	21	52	1	170	15	252	113	31.1	11.1
Parkville	3,347	291	151	132	4	49	36	173	1	33.1	13.1
Pembroke	3,284	77	6	41	2	142	36	83	66	32.0	11.8
Peterborough	3,486	176	29	93	1	61	10	168	7	15.3	6.6
Petrolia	3,182	89	16	33	7	67	6	109	2	21.2	7.8
Pictou	3,871	59	7	23	13	47	6	333	15	15.2	10.9
Port Hope	3,417	157	11	102	16	69	29	194	18	44.9	23.5
Sarnia	3,296	107	2	46	7	49	10	329	2	20.5	10.6
Sault Ste. Marie	8,858	219	6	156	5	135	19	529	85	24.7	19.7
Smith's Falls.	11,015	271	27	152	30	143	28	569	18	24.8	13.7
Southey	5,785	48	9	53	3	87	12	224	75	15.2	9.1
Toronto Junction	6,164	326	63	85	3	197	9	608	75	52.8	13.7
Trenton	4,265	58	27	49	7	42	13	149	28	13.5	11.4
Hawkesbury	5,511	311	41	31	11	117	2	459	28	56.1	5.6
Total	184,847	4,833	620	2,298	133	3,105	188	10,256	728	26.2	12.1

TABLE No. 4.

Illegitimate Births, Twins and Triplets in the Province in 1905.

Illegitimate Births.		Ratio to 1,000 births.	Number of pairs of twins.	Number of cases of triplets
No.	Proportion to the whole number of births.			
699	One to every 74.2 births.....	13.4 to 1,000	M. 547 F. 505 <hr/> 526 pairs	M. 4 F. 11 <hr/> 5 cases

TABLE No. 5.

Births in the Province in 1905, showing the Proportion of Male to Female Births.

Sex.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
Males.....	2,095	1,991	2,536	2,292	2,350	2,319	2,369	2,432	2,243	2,144	1,924	2,012	26,707
Females.....	1,817	1,820	2,307	2,327	2,302	2,103	2,268	2,298	2,207	2,054	1,910	1,791	25,204
Total.....	3,912	3,811	4,843	4,619	4,652	4,422	4,637	4,730	4,450	4,198	3,834	3,803	51,911
Male births to 100 female births...	115.3	109.3	109.9	98.4	102.0	110.2	104.4	105.8	101.6	104.3	100.7	112.3	105.9

TABLE No. 6.

Order of Births by Months in the Province in 1905.

Months.	Males.	Months.	Females.	Months.	Total males and females.
Placed according to number of births in each month.					
March.....	2,536	April.....	2,327	March.....	4,843
August.....	2,432	March.....	2,307	August.....	4,730
July.....	2,369	May.....	2,302	May.....	4,662
May.....	2,360	August.....	2,298	July.....	4,637
June.....	2,319	July.....	2,268	April.....	4,619
April.....	2,292	September.....	2,207	September.....	4,450
September.....	2,243	June.....	2,103	June.....	4,422
October.....	2,144	October.....	2,054	October.....	4,198
January.....	2,095	November.....	1,910	January.....	3,912
December.....	2,012	February.....	1,820	November.....	3,834
February.....	1,991	January.....	1,817	February.....	3,811
November.....	1,924	December.....	1,791	December.....	3,803
Total.....	26,717		25,204		51,921

TABLE No. 7.
Marriages by Months in the Provinces in 1905.

Months.	1904.	Months.	1905.	Quarters.	1904.	Quarters.	1905.
June	2,973	June	2,788	Quarter ending		Quarter ending	
December ...	2,128	September ...	2,211	31st Dec.	5,624	31st Dec.	5,883
September...	2,101	December ...	2,101	Quarter ending		Quarter ending	
October	1,755	October	1,942	30th June	5,511	30th June	5,439
November ...	1,741	November ...	1,840	Quarter ending		Quarter ending	
April	1,497	August	1,578	30th Sept.	4,745	30th Sept.	5,173
August	1,471	July	1,384	Quarter ending		Quarter ending	
January	1,358	January	1,372	31st March	3,872	31st March ...	3,931
March	1,283	April	1,337	No date given..	37		
February	1,231	March	1,325				
July	1,173	May	1,314				
May	1,041	February ...	1,234				
No date given	37						
Total	19,789	Total	20,426	Total	19,789	Total	20,426

TABLE No. 8.
Marriages by Denominations in the Province in 1905.

Denominations.	Number of persons married.	Per cent. of whole.	Proportion to the whole number of persons married.	
Methodists	12,698	31.1	As 1 is to	3.2 persons.
Presbyterians	8,392	20.5	"	4.8 "
Church of England	7,146	17.5	"	5.7 "
Roman Catholics	6,484	15.8	"	6.2 "
Baptists	2,621	6.4	"	15.6 "
Other Denominations	1,254	3.7	"	32.5 "
Lutherans	1,104	2.7	"	36.9 "
Congregationalists	374	0.9	"	109.0 "
No denomination given	326	0.7	"	125.1 "
Evangelical Association	219	0.5	"	186.3 "
Mennonites	144	0.3	"	283.2 "
Quakers	29	0.0	"	1,406.5 "
Total	40,791	100.1		

TABLE No. 9.

Showing the Death rate per 1,000 of population in each County of the Province for ten years.

Counties.	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	Average rate per county for ten years.
Algoma.....		15.9	14.0	16.0	23.7	10.4	13.8	12.4	11.8	13.5	.....
Brant.....	12.3	12.2	11.2	12.9	10.9	12.8	12.0	11.5	13.3	12.9	12.2
Bruce.....	9.7	9.7	8.6	10.1	10.0	11.3	10.4	12.0	12.3	12.4	10.6
Carleton.....	17.9	20.3	19.8	19.9	20.5	18.8	16.4	17.4	16.6	17.6	18.5
Dufferin.....	8.0	8.4	9.6	10.2	10.5	11.3	9.0	11.1	12.6	12.3	10.3
Elgin.....	10.1	11.0	10.2	10.4	10.3	12.2	10.6	10.9	13.3	11.0	11.0
Essex.....	12.6	12.9	12.3	12.2	12.3	13.3	13.1	13.0	13.2	12.2	12.7
Frontenac.....	13.3	13.8	13.9	12.8	13.6	16.0	13.6	16.1	14.2	14.2	14.1
Grey.....	9.7	9.5	9.8	9.7	9.9	12.3	11.0	11.4	11.1	12.5	10.6
Haldimand.....	7.7	10.5	9.8	10.2	9.8	12.3	11.3	9.8	12.4	11.4	10.5
Halton.....	9.2	9.2	9.4	10.7	11.3	14.6	12.1	11.6	13.8	13.3	11.5
Haliburton.....	12.4	11.2	9.5	10.3	9.0	11.1	10.1	12.1	12.2	11.1	10.9
Hastings.....	11.2	11.4	10.8	11.1	11.6	14.4	11.5	11.8	12.1	12.1	11.8
Huron.....	8.3	10.5	9.2	10.5	9.9	11.8	10.0	11.1	11.3	11.0	10.3
Kent.....	9.8	11.7	11.6	12.1	11.6	13.4	12.0	11.6	12.8	12.8	11.9
Lambton.....	8.6	10.8	9.7	12.3	11.7	13.3	12.1	12.1	12.3	12.6	11.5
Lanark.....	10.2	11.8	11.4	11.3	11.6	13.2	11.7	11.8	13.5	13.7	12.0
Leeds and Grenville.....	10.9	12.5	12.6	12.6	12.1	14.4	13.4	15.1	15.2	14.9	13.3
Lennox and Addington.....	9.4	12.6	11.3	11.9	10.6	13.0	11.8	11.4	11.1	12.2	11.5
Lincoln.....	12.2	11.4	12.5	13.4	14.0	14.1	12.6	12.6	15.8	15.2	13.6
Middlesex.....	8.7	10.7	10.0	10.9	10.4	13.5	13.4	13.7	15.2	14.4	12.0
Muskoka.....		11.4	11.0	13.0	14.7	11.7	11.2	11.8	13.2	15.7	.....
Norfolk.....	9.4	12.1	10.4	11.8	11.9	13.4	13.3	11.6	18.6	23.6	13.6
Northumberland and Durham.....	10.1	11.6	11.6	12.2	11.9	13.7	13.9	13.7	14.3	12.4	12.5
Nipissing.....		23.5	20.5	26.6	32.7	17.0	16.2	17.7	13.4	13.0	.....
Ontario.....	10.2	10.6	10.3	10.3	11.7	13.3	12.8	12.1	12.9	12.2	11.6
Oxford.....	11.3	11.8	11.5	12.8	12.9	13.8	12.3	13.3	14.6	14.8	12.9
Peel.....	9.4	9.1	9.2	10.8	9.6	13.2	10.8	12.3	12.3	11.8	10.8
Perth.....	8.8	9.5	10.8	9.5	10.4	12.2	10.0	12.3	13.2	14.0	11.0
Peterboro.....	11.2	12.0	12.7	13.3	12.4	12.8	14.2	14.8	18.9	10.4	13.2
Prescott and Russell.....	13.1	16.9	13.6	15.3	16.1	18.0	13.8	16.4	15.6	13.4	15.2
Prince Edward.....	13.8	12.4	11.0	12.1	12.0	15.5	13.7	13.2	14.7	15.8	13.4
Parry Sound.....		14.7	13.6	16.3	19.2	10.2	11.3	10.3	12.6	13.4	.....
Rainy River.....		33.1	26.1	33.8	45.6	9.3	8.5	7.9	10.8	11.2	.....
Renfrew.....	12.2	13.0	9.9	10.3	11.3	12.2	11.1	12.0	12.1	13.6	11.7
Simcoe.....	10.7	11.7	11.3	12.1	13.0	11.2	11.3	12.4	12.7	13.4	11.9
Stormont, Dundas and Glengarry.....	9.0	12.7	11.3	11.9	10.9	12.8	11.4	11.4	13.6	13.0	11.8
Thunder Bay.....		20.4	16.4	21.7	30.2	11.5	16.8	20.0	25.0	21.0	.....
Victoria.....	9.8	10.8	10.8	10.4	11.7	12.3	11.9	12.5	12.1	12.1	11.4
Waterloo.....	10.1	10.9	10.2	11.2	12.0	11.8	10.0	11.3	11.5	11.9	11.0
Welland.....	12.1	14.4	12.9	13.1	11.8	13.7	12.6	14.1	15.7	15.6	13.6
Wellington.....	9.5	9.9	9.3	10.9	10.6	12.2	11.0	12.6	13.4	12.4	11.1
Wentworth.....	13.2	12.1	13.0	12.8	13.0	14.7	13.7	14.6	16.7	16.4	14.0
York.....	12.1	12.9	11.8	13.5	14.5	15.6	14.5	17.0	17.9	18.1	14.8
Average rates.....	10.7	12.9	11.9	13.2	14.0	13.1	12.6	12.8	14.1	14.2	12.9

TABLE No. 10.

Recapitulation by Classes of Diseases by Counties in 1905—(Including Cities and Towns), showing Sex, Nativity, Social Condition, Age Groups and Months.

Causes of Deaths.	Sex.		Nativity.		Social condition.		Under 5.																	Ages.												Months.												Totals.
	Male.	Female.	Not stated.	Canada.	Foreign.	Not stated.	Single.	Married.	Not stated.	0-1	1	2	3	4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-59	60-69	70-79	80 and over.	Not given.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.								
I. Communicable (Epidemic) diseases...	800	655	2	1,234	191	324	1,121	291	42	205	127	102	88	76	186	86	88	93	69	50	33	35	23	39	41	54	39	205	413	150	125	118	101	106	97	111	123	126	128	126	1457							
II. Other general diseases...	2166	2033	13	3617	683	114	4772	2812	228	3	63	37	29	23	72	127	329	184	161	359	327	307	305	271	674	463	131	504	390	373	466	445	466	411	422	345	318	386	388	402	4812							
III. Diseases of nervous system and organs of sense...	1850	1653	1	2138	1071	263	1240	1881	386	100	115	84	50	42	99	76	70	76	55	48	81	98	112	321	517	685	381	191	297	299	327	312	282	243	302	303	298	287	289	265	255	3504						
IV. Diseases of circulatory system...	1087	987	7	1187	835	500	407	1571	103	3	2	3	23	50	51	45	48	52	80	82	102	296	181	529	219	12	201	173	193	156	189	137	178	171	146	170	184	180	2081						
V. Diseases of the respiratory system...	1719	1491	2	2251	915	140	1653	1558	101	653	213	87	42	30	80	56	62	73	78	95	85	96	95	226	386	529	298	26	120	171	173	300	267	170	133	90	115	169	262	285	3215							
VI. Diseases of the digestive system...	1740	1449	4	2659	491	43	2136	981	71	1297	166	67	50	32	94	81	80	111	86	71	82	56	81	189	236	288	112	14	143	140	175	166	152	157	363	586	525	426	160	151	3193							
VII. Diseases of the genito-urinary system...	706	437	2	637	477	31	206	886	55	1	2	3	6	8	10	24	35	40	50	47	59	63	144	254	271	115	13	126	105	101	84	96	90	76	89	79	107	106	86	1115							
VIII. Puerperal diseases...	211	187	22	2	5	206	9	37	37	50	41	26	5	1	27	22	25	24	20	20	18	14	9	7	10	15	211							
IX. Diseases of the skin and adnexa...	39	40	56	23	26	47	6	3	1	1	1	2	3	4	3	6	6	6	6	6	17	15	3	2	7	17	9	6	5	5	8	5	4	5	3	3	3	79							
X. Diseases of the locomotor system...	27	9	23	12	1	9	21	3	1	1	3	2	2	2	2	12	7	4	2	4	3	3	1	3	5	3	4	2	2	3	3	36								
XI. Malformations, diseases of infancy, diseases of old age...	1770	1117	101	5503	2411	74	4228	5547	113	5108	126	26	9	3	1	802	826	876	779	737	632	767	720	741	787	682	699	8988							
XII. Suicide...	89	20	76	28	3	40	61	8	1	3	12	9	9	13	10	11	22	8	6	4	1	9	5	12	9	5	7	14	2	7	13	15	11	109							
XIII. Accidents...	1100	227	12	867	376	94	738	503	98	25	32	27	20	12	62	51	128	117	110	98	88	71	61	116	101	75	35	41	85	79	90	86	129	136	139	139	110	117	114	115	115	1339						
XIV. Ill-defined causes...	578	621	1	850	308	424	373	759	68	8	5	10	17	31	31	42	68	64	59	68	83	82	224	237	103	48	12	90	98	115	121	118	86	80	87	95	101	97	112	1200							
Totals.....	16,671	14,553	145	22,285	8,241	843	12,924	17,133	1,312	7,694	851	441	304	244	662	574	879	1,167	1,094	946	957	934	952	2,170	3,173	4,191	3,704	2,770	2,747	2,990	2,667	2,573	2,205	2,540	2,666	2,612	2,703	2,441	2,455	31,369								

TABLE NO. 11.
Recapitulation by Classes of Diseases by Cities, 1905.

Causes of Deaths.	Sex.		Nativity.		Social condition.		Ages.												Months.												Totals.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
	Male.	Female.	Not stated.	Canada.	Foreign.	Not stated.	Single.	Married.	Not stated.	Under 5.												Stand over.												December.	November.	October.	September.	August.	July.	June.	May.	April.	March.	February.	January.	Not given.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
										0-1.	1-2.	2-3.	3-4.	5-9.	10-14.	15-19.	20-24.	25-29.	30-34.	35-39.	40-44.	45-49.	50-59.	60-69.	70-79.	Stand over.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							

TABLE

Total Deaths by Individual

General Diseases.

		Number.	Algonia.	Brant.	Bruce.	Carleton.	Dufferin.	Elgin.	Essex.	Frontenac.	Grey.	Haldimand.	Halton.	Hastborton.	Hastings.
Communicable Diseases.	Typhoid Fever.....	1	17	2	2	18	2	3	16	9	16	3	4	1	6
	Smallpox.....	2													
	Measles.....	3	1	1		17	1	1		1	2				
	Scarlet Fever.....	4	2	2	5	7									
	Whooping Cough.....	5	4	2	8	11		3	2	1	5	2			
	Diphtheria and Croup.....	6	3			6	6	5	19	11	13		4	1	11
	Influenza.....	7	6	2	7	8		2	6	1	9	1	1	2	2
	Other Epidemic Diseases.....	8				3									
Other General Diseases.	Pyæmia and Septicæmia.....	9	2	4	6	9		6	2	4	6	1			7
	Malarial Fever.....	10									1				
	Tuberculosis and Scrofula.....	11	7	24	65	145	17	42	54	64	73	26	20	4	73
	Syphilis.....	12													
	Cancer.....	13	8	22	37	51	11	22	24	28	37	12	10		24
	Rheumatism and Gout.....	14	5	1	4	8	1	2	6	3	3	2	2		5
	Diabetes.....	15	3	1	6	7	2	5	4	6	11	1	1		2
	Other General Diseases.....	16	1	8	13	12	4	2	5	1	12	1	3	1	6
Alcoholism, Acute and Chronic.....	17	1	5			2		3		2				2	
Diseases of the Nervous System.	Encephalitis.....	18	2		1	1		3	2	3	3	2		1	3
	Simple Meningitis.....	19	5	11	13	33	1	4	10	9	6	5	5	1	9
	Epidemic Cerebro-spinal Meningitis.....	20	5		2	14		1	4	1	2				1
	Congestion and Hemorrhage of the Brain.....	21	6	29	23	40	5	11	35	13	12	5	10		31
	Softening of the Brain.....	22		1	2						2				1
	Paralysis without specified cause.....	23	9	20	22	52	13	28	20	36	35	13		2	29
	Insanity.....	24		1	3	1		2	1	3	3			1	1
	Epilepsy.....	25	1	1	3	3				3	1				3
	Convulsions (not puerperal).....	26	21	7	10	22		19	13	14	19	3	6	3	8
	Other Nervous Diseases.....	27	2		8	13	1	5	1	3	4	4	2		8
	Diseases of the Circulatory System.	Pericarditis.....	28							2		1	1		
Endocarditis.....		29	2		4	17	3	1	9	1	10				2
Organic Heart Diseases.....		30	16	27	10	96	19	26	32	32	46	24	23	4	45
Angina Pectoris.....		31		1	1	2						1			5
Dis. of the Arteries, Atheroma, Aneurism, etc.....		32		4	7	10		2	1	3	2	1	1		2
Other Diseases of the Circulatory System.....		33									2				
Diseases of the Respiratory System.	Acute Bronchitis.....	34	5	4	4	21	2		3	1	17	3	1	1	2
	Chronic Bronchitis.....	35	1	8	6	15	5	4	10	2	8	1	1		11
	Broncho-pneumonia.....	36	3	2	4	38	5	1	6	4	9	5	3	1	5
	Pneumonia.....	37	23	21	49	99	16	44	58	37	45	9	18	4	54
	Pleurisy.....	38			4	5		2	5	4	6				1
	Congestion of the Lungs (inc. pulm. apop.).....	39	5	1	4	11	3	3	9	2	3	2	2	2	7
	Asthma and Emphysema.....	40	1		3	4			1	2					2
	Other Diseases of the Respiratory System.....	41	1	1	3	3	1		1	3	3		1		5
Diseases of the Digestive System.	Ulcer of the Stomach.....	42	2	1	2				2			1			2
	Other Dis. of the Stomach (Cancer excepted).....	43	5	3	11	17		5	5	6	9	2	1	2	17
	Infantile Diarrhoea and Gastro-enteritis ("Cholera Infantum").....	44	72	19	31	155	6	13	30	20	21	9	9	2	23
	Diarrhoea and Enteritis (not infantile).....	45	6	4	6	12			8	4	2	11	3	5	5
	Dysentery.....	46	1		3	1		2	1	1					1
	Hernia and Intestinal Obstructions.....	47	2	7	3	12	2	1	2	5	2	2	1	1	7
	Other Diseases of the Intestines.....	48	2		1	3					4				2
	Diseases of the Liver.....	49	3	3	7	14	2	4	5	14	3	5			8
	Peritonitis (not puerperal).....	50	5	1	7	20	2	8	11	1	12	3	2	1	5
	Iliac abscess (typhlitis, peri-typhlitis, appendicitis).....	51	1	5	9	13	7	4	3	9	11		3		4
	Diseases of the Urinary System.	Acute Nephritis.....	52		3	7	1	1	3	2	2	5	1	2		1
Bright's Disease.....		53	5	6	16	44	5	11	19	13	14	4	9	2	12
Other Diseases of the Kidneys and Adnexa.....		54	3		3	4	4	6	4	5	2	2	1	1	1
Vesical Calculi.....		55													
Diseases of the Bladder.....		56	1	2	1	4	3	1	2	2	3	1	1		1
Diseases of the Male Genital Organs.....		57								1	1	1			
Metritis.....		58													
Other Diseases of the Uterus.....		59				2			1	1					
Ovarian Cysts and other Ovarian Tumors.....		60	1	1					1						
Other Diseases of the Female Genital Organs.....		61				4			1		1	1			1

NO. 13.

Diseases by Counties in 1905.

[illegible]

TABLE

Deaths by Individual

General Diseases.		Number.	Albion.	Brant.	Bruce.	Carleton.	Inferior.	Elgin.	Essex.	Frontenac.	Guy.	Haldimand.	Halton.	Haliburton.	Hastings.
Puerperal Diseases.	Puerperal Septicæmia.....	62	1	2		3			2						
	Puerperal Albuminuria and Convulsions.....	63	2	3	2	1	1	1	1		3		1	1	
	Other Accidents of Pregnancy, sudden death.....	64	8		2	4	1	3	2	4	2				6
	Puerperal Disease of the Breast.....	65													
Dis. of Skin.	Erysipelas.....	66	1		2	1	1	1		2	5			1	3
	Other Diseases of the Skin and its adnexa (Cancer excepted).....	67				2								1	1
Dis. loco-mot'n.	Pott's Disease.....	68												2	
	Diseases of Bones and Joints.....	69		3		1				1					
	Amputation (for unspecified Disease).....	70													
Mal-formations.	Still-Births.....	71	24	34	32	117	9	14	46	27	40	6	6	2	22
	Congenital Debility and malformations.....	72	97	55	44	265	37	26	93	69	82	19	25	7	64
	Other Diseases of Infancy.....	73	8		1	8		1	3	2	3			1	2
	Senile Decay.....	74	44	75	122	123	40	70	61	110	133	39	31	10	95
Suicide.	Poison.....	75		1		2		1					2		
	Strangulation.....	76		1				1	2		1				
	Gas Poisoning.....	77													
	Drowning.....	78							1						1
	Firearms.....	79	1				1								
Accidents.	Other Methods.....	80	1			2	2	3		3					1
	Fractures and Dislocations.....	81	7	7	5	4	1	2	3	5	6	1	2	1	9
	Gunshot.....	82	1		3	1		1		3	1		1		3
	Lightning.....	83				3	1				1				
	Drowning.....	84	26	6	6	10		3	12	6	4	4	3	5	9
	Electric Cars.....	85							1						
	Bicycles.....	86													
	Railways.....	87	9			3	2	5	5	3	3	2	5		9
	Burns and Scalds.....	88	3	2	4	4			5		1	1	1	1	2
	Homicide.....	89					3								
	Other Accidents.....	90	13	10	7	11	4	7	17	5	15	2	5		13
	Asphyxia.....	91													
	Poison.....	92													
Ill-De-fined Causes.	Dropsy.....	93	6		6	3	2	13	4	6	11	1	1	1	6
	Tumors.....	94	2	1	3	4		4	1	3	6	1			3
	Other Ill-Defined Causes.....	95	9	13	10	22	2	1	6	7	13	4	3	3	6
	Heart Failure.....	96	10	11	11	23	3	11	5	7	11	4	11	1	10
	Tetanus.....	97		1		5			1	1					
	Judicial Execution.....	98													
Totals.....			620	498	742	1,734	263	489	727	643	885	245	264	74	730

NO. 13.—Continued.

Diseases by Counties in 1905.—Continued.

Huron.	Kent.	Lambton.	Lanark.	Leeds and Grenville.	Lennox and Addington.	Lincoln.	Middlesex.	Muskoka.	Nipissing.	Norfolk.	Northumberland and Durham.	Ontario.	Oxford.	Parry Sound.	Peel.	Perth.	Peterboro.	Prescott and Russell.	Prince Edward.	Rainy River.	Renfrew.	Simcoe.	Stormont, Dundas and Glengarry.	Thunder Bay.	Victoria.	Waterloo.	Welland.	Wellington.	Wentworth.	York.	Total.	Numbers.		
1	1	2	1	1	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	5	2	1	1	2	2	1	2	27	62			
1	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5	1	1	1	2	2	1	3	49	63			
1	7	2	2	4	3	4	2	13	1	2	1	1	1	1	1	2	3	2	1	3	4	9	1	3	4	2	3	4	15	135	64			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	65		
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	66		
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	67		
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	68		
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	69		
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	70		
32	30	37	21	25	3	26	67	14	32	12	37	18	32	12	4	17	45	32	10	7	34	70	37	13	24	37	31	42	101	342	1,623	71		
40	78	73	42	71	19	46	105	19	140	32	58	54	52	40	25	53	55	212	14	25	83	143	98	89	42	70	36	65	120	650	3,543	72		
1	2	1	1	6	6	6	3	1	8	1	1	1	4	1	2	2	3	10	1	6	2	5	1	1	2	4	8	1	9	108	73			
126	89	84	80	128	61	56	191	26	28	53	157	75	106	26	53	83	53	73	50	12	95	147	162	7	70	73	90	84	95	329	3,714	74		
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	75		
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	76		
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	77		
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	78		
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	79		
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	80		
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	81		
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	82		
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	83		
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	84		
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	85		
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	86		
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	87		
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	88		
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	89		
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	90		
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	91		
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	92		
2	6	2	8	7	2	1	7	1	1	3	6	3	2	4	1	6	5	7	6	1	8	6	6	6	11	8	9	4	8	207	93			
6	3	6	2	4	12	4	9				4	12	5	1	1		3	3	1	1	12	4	4				7	7	15	129	94			
5	6	9	5	23	5	4	12	4	31	5	14	6	8	7	3	11	6	15	5	6	16	30	18	6	3	1	8	5	7	39	428	95		
13	6	4	16	14	1	4	21	9	7		20	5	12	7	3	8	4	2	4	8	14	15	13	2	8	3	8	8	10	47	417	96		
																																20	97	
																																	1	98
692	746	742	516	892	289	472	1,357	334	640	366	816	499	726	299	306	526	489	758	243	187	726	1,118	912	267	393	635	499	701	1,318	4,993	31,371			

TABLE NO. 14.

Total Deaths by Individual Diseases in Cities in 1905.

General Diseases.	Toronto.	Hamilton.	Ottawa.	London.	Kingston.	Bramford.	St. Thomas.	Guelph.	St. Catharines.	Belleville.	Stratford.	Windsor.	Chatham.	Woodstock.	Peterboro.	Totals.
I. COMMUNICABLE (EPIDEMIC) DISEASES.																
1. Typhoid Fever	41	13	14	10	7	2	1	2	3	2	4	6	3	3	6	117
2. Smallpox	1	8	15													2
3. Measles	5	2	6	3			1	1								26
4. Scarlet Fever	17	10	7			1	1						1	3		20
5. Whooping Cough	139	28	5	10	3		2	2	2	5		1	3	5	3	205
6. Diphtheria and Croup	12	1	2	2	1		1	1		1		1			1	23
7. Influenza				3												3
8. Other Epidemic Diseases																
II. OTHER GENERAL DISEASES.																
1. Pyæmia and Septicæmia	24	3	6	4	3	3	2	1	2		4		3	1	5	61
2. Tuberculosis and Scrofula	311	78	101	62	33	11	7	13	18	22	4	16	15	17	20	728
3. Syphilis	3									1						4
4. Cancer	191	40	39	24	22	6	19	7	6	7	4	5	8	8	15	392
5. Rheumatism and Gout	10	7	4	1						2	2	1	1		2	31
6. Diabetes	34	6	4	5	4		2	4	2		1	2	7			71
7. Other General Diseases	50	13	11	5	1	5	1	2	4	5	1	2	3	6	3	112
8. Alcoholism, Acute and Chronic	6			2		4		1	2			1				16
LOCAL DISEASES.																
III. DISEASES OF NERVOUS SYSTEM AND ORGANS OF SENSE.																
1. Encephalitis	1		1		1				1	1			1			5
2. Simple Meningitis	67	27	25	9	6	8	4	1	1	1	6	4		1	1	161
3. Epidemic Cerebro-spinal Meningitis	6	3	6	2												19
4. Congestion and Hemorrhage of Brain	133	42	29	24	7	11	3	4	8	9	3	9	8	5	7	297
5. Softening of the Brain	14	6		1			2	1		3	2	1			2	32
6. Paralysis without specified cause	82	17	42	15	20	13	10	7	8	9	3	4	9	9	2	250
7. Insanity	1	1											1			4
8. Epilepsy	14	2	1					1		1						19
9. Convulsions (not puerperal)	52	19	13	16	8	3	6	2					3	3	3	123
10. Other Nervous Diseases	24	2	7	5	2	1	2	3	1	3	1	1	3	1	4	60
IV. DISEASES OF CIRCULATORY SYSTEM.																
1. Pericarditis	6			2									1			9
2. Endocarditis	21	4	17				1	1	1	1						53
3. Organic Heart Diseases	267	46	65	46	20	9	8	5	17	13	16	11	6	15	21	559
4. Angina Pectoris	19	5	1	3			1			3						32
5. Diseases of Arteries, Atheroma, Aneurism, etc.	26	2	5	6		3		3		1				3	1	50
V. DISEASES OF THE RESPIRATORY SYSTEM.																
1. Acute Bronchitis	53	13	19	4	1	3		2	4				1	4		108
2. Chronic Bronchitis	14	10	6	4	3	4	2		4	5	1	3	2	1	1	60
3. Broncho-pneumonia	72	16	33	4	2		1	4	1						3	141
4. Pneumonia	227	61	60	33	20	10	17	6	20	13	6	16	6	15	16	526
5. Pleurisy	10	3	4	3	3		1				1	2		2	2	31
6. Cong. of the Lungs (inc. pulmonary apoplexy)	12	2	9	1	3			2	2	1				2	1	35
7. Asthma and Emphysema	3	7	3	2												15
8. Other Diseases of Respiratory System	5	2	2	2	3	1			1				1		2	18
VI. DISEASES OF THE DIGESTIVE SYSTEM.																
1. Ulcer of the stomach	5	4							1							10
2. Other Diseases of Stomach (cancer excepted)	23	7	7	3	2	2	4	1	2	3			1	2	1	58
3. Infant. Diarr. gastro-enteritis. Chol. Infantum	232	44	115	27	13	10	7	9	5		1	4	18	9	4	498
4. Diarrhea and Enteritis (not infantile)	17	13	7	11			1	3	1		2	2	2			60
5. Dysentery	1													1		4
6. Hernia and Intestinal obstructions	15	7	9	1	3	4	1	1	2	3			2		3	55
7. Other Diseases of the Intestines	9	1	3	1					1		2					18
8. Diseases of the Liver	24	13	11	3	4	1	1	2	4	3			2		5	75
9. Peritonitis (not puerperal)	50	8	14	4	1	2	3	1	3		1	4	3	3	1	98
10. Ilia Abscess and Appendicitis	21	12	10	5	5	3	2	1		1		1	1	1	6	72

TABLE NO. 14.—Continued.

General Diseases.	Toronto.	Hamilton.	Ottawa.	London.	Kingston.	Brantford.	St. Thomas.	Guelph.	St. Catharines.	Belleville.	Stratford.	Windsor.	Chatham.	Woodstock.	Peterboro.	Totals.
VII. DISEASES OF THE GENITO-URINARY SYSTEM.																
1. Acute Nephritis	157	28	35	31	8	5	12	9	5	1	5	8	12	3	8	2
2. Bright's Disease	9	2	5	1	2	1	2	1	2	2	1	1	1	1	2	307
3. Other Diseases of Kidneys and Adnexa	13	3	2	1	1	2	1	1	1	1	1	1	1	3	1	27
4. Diseases of the Bladder	8	4	1	1	1	1	1	1	1	1	1	1	1	1	1	26
5. Diseases of the Male Genital Organs	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	15
6. Other Diseases of the Uterus	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5
7. Ovarian Cysts and other Ovarian Tumors	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3
8. Other Diseases of the Female Genital Organs	2	3	1	1	1	1	1	1	1	1	1	1	1	1	1	9
VIII. PUERPERAL DISEASES.																
1. Puerperal Septicemia	12	1	1	1	1	1	1	1	1	1	1	1	1	1	1	6
2. Puerperal Albuminuria and Convulsions	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	8
3. Other Accidents of Pregnancy, sudden death	8	4	3	3	2	2	1	1	1	1	1	1	1	1	1	24
4. Puerperal Diseases of the Breast	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
IX. DISEASES OF THE SKIN AND CELLULAR TISSUE.																
1. Erysipelas	11	2	1	1	2	1	1	1	2	1	1	1	1	1	1	21
2. Skin and Adnexa (cancer excepted)	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	6
X. DISEASES OF THE LOCOMOTOR SYSTEM.																
1. Pott's Disease	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2. Diseases of Bones and Joints	5	3	1	1	1	1	1	1	1	1	1	1	1	1	1	12
3. Amputation (for unspecified disease)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
XI. MALFORMATIONS, DISEASES OF INFANCY, DISEASES OF OLD AGE.																
1. Still-Births	273	85	96	50	21	32	10	18	16	6	4	16	7	9	19	661
2. Congen. Debility and Malformations	550	93	220	64	42	32	11	15	28	12	16	30	23	18	17	1,171
3. Other Diseases of Infancy	5	1	4	1	1	1	1	1	1	1	1	1	1	1	1	16
4. Senile Decay	205	61	57	73	55	29	15	10	13	17	21	13	14	18	22	623
XII. SUICIDE.																
1. Poison	6	1	1	2	1	1	1	1	1	1	1	1	1	1	1	14
2. Strangulation	5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	10
3. Drowning	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
4. Firearms	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
5. Other Methods	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5
XIII. ACCIDENT.																
1. Fractures and Dislocations	27	4	4	8	3	2	10	1	1	1	1	1	1	1	1	53
2. Gunshot	9	2	1	1	2	1	1	1	1	1	1	1	1	1	1	14
3. Drowning	20	4	3	4	4	4	2	4	2	4	3	1	1	1	1	16
4. Electric Cars	11	2	1	1	1	1	1	1	1	1	1	1	1	1	1	15
5. Railways	11	3	2	5	1	4	1	3	3	3	2	2	2	2	2	37
6. Burns and Scalds	11	4	1	4	2	2	2	2	2	3	1	2	2	2	2	30
7. Homicide	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2
8. Other Accidents	64	22	9	9	6	6	4	3	2	2	5	3	1	4	5	115
XIV. ILL-DEFINED CAUSES.																
1. Dropsy	5	3	2	3	1	4	1	1	1	1	1	1	3	1	1	21
2. Tumors	13	7	3	6	2	1	1	1	1	1	1	1	1	1	1	39
3. Other Ill-Defined Causes	33	6	17	9	5	4	1	1	2	5	1	3	2	2	2	91
4. Heart Failure	34	7	17	6	5	6	2	2	1	4	3	2	2	2	2	89
5. Tetanus	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	6
6. Judicial Execution	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Totals from all causes	3,887	963	1,232	652	366	256	168	155	207	169	124	193	184	197	225	8,978

TABLE No. 15.

Showing Total Deaths by Individual Diseases in 11 Towns in 1905.

General Diseases.	Berlin.	Brockville.	Cornwall.	Lindsay.	Niagara Falls.	Owen Sound.	Galt.	Kelowna.	Sarnia.	Sault Ste. Marie.	Toronto Junction.	Totals.
I. COMMUNICABLE (EPIDEMIC) DISEASES.												
1. Typhoid Fever	2	2	2	5		5		5	3	12		36
2. Smallpox												1
3. Measles												3
4. Scarlet Fever	1		1		1							3
5. Whooping Cough		1				4	1		1			9
6. Diphtheria and Croup	5	1			1	2	2	2	1	1	5	21
7. Influenza	3					1			1		1	6
8. Other Epidemic Diseases										2		2
II. OTHER GENERAL DISEASES.												
1. Pyæmia and Septicæmia		2	1			1	1		1			6
2. Malarial Fever												
3. Tuberculosis and Scrophula	11	27	12	12	7	12	9	16	4	15	15	140
4. Syphilis												
5. Cancer	13	10	6	2		7	4	3	10	3	6	64
6. Rheumatism and Gout	1	1	1		1	1	1		1	2	1	10
7. Diabetes	1	1	2							1	1	9
8. Other General Diseases	3	3	1	5	1	6	1		3	1		24
9. Alcoholism, Acute and Chronic												
LOCAL DISEASES.												
III. DISEASES OF NERVOUS SYSTEM AND ORGANS OF SENSE.												
1. Encephalitis					1	1						2
2. Simple Meningitis	4	4	1	2	1	2	3		2	3	9	31
3. Epidemic Cerebro-spinal Meningitis		2		2								4
4. Congestion and Hemorrhage of the Brain	3	11	7	2	1	3	2		2	3	4	38
5. Softening of the Brain						1				1		2
6. Paralysis without specified cause	3	2	4	2	4	3	1		1	1	3	24
7. Insanity		1										1
8. Epilepsy						1						1
9. Convulsions (not puerperal)	3	1		2	2	5	3		5	1	7	29
10. Other Nervous Diseases		1	1			3			1	2	1	9
IV. DISEASES OF CIRCULATORY SYSTEM.												
1. Pericarditis		1				1			1			3
2. Endocarditis		2				4					1	7
3. Organic Heart Diseases	13	13	6	5	1	11	4		2	5	6	66
4. Angina Pectoris		1									1	2
5. Diseases of the Arteries, Atheroma, Aneurism, etc.	1						2					3
6. Other Diseases of the Circulatory												
V. DISEASES OF THE RESPIRATORY SYSTEM.												
1. Acute Bronchitis	6	1	2	2		4	1		5	1	7	29
2. Chronic Bronchitis	4	1	1	2		2	3		1			14
3. Broncho-pneumonia	1	2	1	1	1	2	3		5		3	20
4. Pneumonia	6	14	2	11	6	7	8	3	10	11	4	82
5. Pleurisy				1		1						2
6. Congestion of the Lungs (inc. pulmonary apoplexy)	1		2		2		1	1			4	11
7. Asthma and Emphysema	2											2
8. Other Diseases of the Respiratory System			1								1	2
VI. DISEASES OF THE DIGESTIVE SYSTEM.												
1. Ulcer of the Stomach		1	1							1		3
2. Other Diseases of Stomach (cancer excepted)	3	2	3	1			2		1	1	2	15
3. Infant. Diarrhoea & Gastro-enteritis (Cholera Infantum)	4	12	7	4	8	6	4	3	5	25	19	97
4. Diarrhoea and Enteritis (not infantile)	2	1	1	1			1		1		2	9
5. Dysentery						1			1		1	3
6. Hernia and Intestinal obstructions		3							1			5
7. Other Diseases of the Intestines		1	3		1	2			1		1	9
8. Diseases of the Liver	1			1		1	4		2	1	1	11
9. Peritonitis (not Puerperal)	1	4	4	1		3	1				4	18
10. Bile Abscess (typhilitis, perityphilitis & appendicitis)	3					2	3		3	2	1	14

TABLE No. 15.—Continued.

Showing total Deaths by Individual Diseases in 11 Towns in 1905.—Continued.

General Diseases.	Berlin.	Brockville.	Cornwall.	Lindsay.	Niagara Falls.	Owen Sound.	Galt.	Kenora.	Sarnia.	Sault Ste. Marie.	Toronto Junction.	Totals.
VII. DISEASES OF THE GENITO-URINARY SYSTEM.												
1. Acute Nephritis		1							1		1	3
2. Bright's Disease	4	1	3	4	7		5	1	4	2	2	31
3. Other Diseases of the Kidneys and Adnexa	1		3	3						1		8
4. Vesical Calculi												
5. Diseases of the Bladder	6			1							1	8
6. Diseases of the Male Genital Organs												
7. Metritis											1	1
8. Other Diseases of the Uterus												
9. Ovarian Cysts and other Ovarian Tumors												
10. Other Diseases of the Female Genital Organs		1							1			2
VIII. PUERPERAL DISEASES.												
1. Puerperal Septicæmia												
2. Puerperal Albuminuria and Convulsions												
3. Other Accidents of Pregnancy, sudden death							1				1	2
4. Puerperal Disease of the Breast												
IX. DISEASES OF THE SKIN AND CELLULAR TISSUE.												
1. Erysipelas						2						2
2. Other Diseases of Skin and its adnexa (Cancer excepted)					1							1
X. DISEASES OF THE LOCOMOTOR SYSTEM												
1. Pott's Disease												
2. Diseases of the Bones and Joints			1									1
3. Amputation (for unspecified diseases)												
XI. MALFORMATIONS, DISEASES OF INFANCY, DISEASES OF OLD AGE.												
1. Still-Births	8	14	5	5	10	13	7		14	2	20	98
2. Congenital Debility and Malformations	16	21	14	15	10	15	13	5	15	19	31	174
3. Other Diseases of Infancy	1				1	1				1		4
4. Senile Decay	15	14	19	18	20	20	13	10	12	5	10	166
XII. SUICIDE.												
1. Poison								1				1
2. Strangulation								1				
3. Gas Poisoning												
4. Drowning												
5. Firearms	1				1			1				3
XIII. ACCIDENT.												
1. Fractures and Dislocations		1	1		1	3		1			1	8
2. Gunshot				2						1		3
3. Lightning												
4. Drowning			2			1	1	10	3	5	1	23
5. Electric Cars												
6. Bicycles												
7. Railways	1	1	1	1	4	2	1			2	3	23
8. Burns and Scalds	1	2	1		2			2	2	1		11
9. Homicide												
10. Other accidents	3	3		1	3	2	2	2	1	6	5	28
XIV. ILL-DEFINED CAUSES.												
1. Dropsy	2	1			1		2	1				7
2. Tumors		2				1			1		1	5
3. Other Ill-Defined Causes			3					3			2	10
4. Heart Failure	2	1		3	2	1	1	1	1	3	5	23
5. Tetanus									1			1
Totals	162	192	126	117	104	170	112	80	134	143	197	1,537

TABLE No. 16.

TABLE SHOWING DEATHS BY OCCUPATIONS AND AGES IN ONTARIO IN 1905.

Occupations.	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-59	60-69	70-79	80 and over.	Not given.	Totals.	
													Males.	Females.
Agents:														
Males				1	5	7	6	12	24	23	7	1	86	
Artists:														
Males							3		1	1			5	
Females				1	1			1				1		5
Architects:														
Males				1		1		1	1	1			5	
Auctioneers:														
Males								2					2	
Brewers, Distillers, etc.:														
Males								1					1	
Bakers, Confectioners:														
Males		2		1	1	3	3	8	3	2	1		24	
Barbers:														
Males				2	5	4	2	3	3	1	1	1	22	
Butchers:														
Males	2			2	1	1	3	7	9	14	3	2	45	
Bartenders:														
Males				1		1	3						5	
Bookkeepers:														
Males	3	1		2	3	6	3	3	5	11	3		40	
Females	1			1				1						3
Bookbinders:														
Males		1				1	1	2		1		1	7	
Blacksmiths:														
Males	1			6	1	6	8	9	11	15	14	9	81	
Brickmakers:														
Males	1	1					2	1					5	
Bankers:														
Males				3	1	2	3	1	3	9	1		23	
Builders and Contractors:														
Males		1			2	3	1	8	18	26	16	8	83	
Boardinghouse Keepers:														
Males								2			1		3	
Females								1						1
Carpenters:														
Males	5	4		6	14	8	7	6	44	59	48	35	236	
Cabinetmakers:														
Males	3			1	1	2	3		1	5	8	4	28	
Coopers:														
Males				1	1		1	1	5	3	4	5	21	
Cooks:														
Males				4		2	2	2	2	2		1	15	
Females						1	1	1	2					5
Chemists and Druggists:														
Males		2			1	3			3		1		10	
Clergymen:														
Males				2	4	1		1	10	16	14	12	60	
Carriage and Wagon Makers:														
Males						1			5	9	6	1	22	
Clerks:														
Males	31	37		36	12	12	14	8	18	22	7	7	204	
Females	8	12		8	2		3	5				1		39
Cheesemakers:														
Males		1		2	1		1				1		7	
Cigar makers:														
Males		1		4	1	3	1					1	11	
Females		1		1										2
Commercial Travellers:														
Males				3	5	1	1	5	8	10	3	2	40	
Dentists:														
Males				4									4	
Dressmakers:														
Females	2	7		5	5	1	1	1	2	2	1			27
Engineers:														
Males	1	3		7	7	2	1	4	2	7	3	1	38	
Electricians:														
Males		5		2	2	1	1	1	1	1			14	
Engravers:														
Males														
Editors, Reporters, etc.:														
Males		1		2		2		1	2	3			11	
Foremen and Forewomen:														
Males		2		3	5	6	2	1	5	1	2	1	28	
Females		1				1		1	2	1				14
Farmers:														
Males	104	158		119	102	105	116	161	544	753	825	724	3,756	
Furriers:														
Males	1									2	1		4	
Females						1		1	1	2				5

TABLE No. 16.—Continued.

DEATHS BY OCCUPATIONS AND AGES IN ONTARIO IN 1905.—Continued

Occupations.	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-59	60-69	70-79	80 and over.	Not given.	Totals.	
													Males.	Females.
Factoryhands:														
Males.....	4	1	1	2									8	
Females.....	6	5	1	4										16
Gardeners:														
Males.....	2		2	1	1	3	10	22	25	9			75	
Gentlemen:														
Males.....				8	16	22	17	49	203	420	457	6	1,198	
Hunters and Fishermen:														
Males.....		1	3	1	6	1	3	2	5	6	1		29	
Housewives:														
Females.....	50	203	254	303	373	213	205	677	1,092	1,455	1,148	35	6,008	
Harnessmakers and Saddlers:														
Males.....			17	2	2	1	5	7	6	2			42	
Hotelkeepers:														
Males.....			2	6	9	11	14	8	12	4	3	2	71	
Females.....										1				1
Laborers:														
Males.....	90	140	122	78	69	90	91	180	239	232	140	13	1,484	
Lumbermen:														
Males.....	6	7	9	5	7	4	5	12	6	4	2	2	69	
Lawyers:														
Males.....				1	4	2	3	8	8	5	4	1	36	
Laundry:														
Males.....		1	1	1	2	1							6	
Females.....	2	1			1		1						5	
Liverymen:														
Males.....		1		1	1	6	2	1	2				14	
Masons:														
Males.....	1	2	3	5	6	7	10	13	7	14	3		71	
Machinists:														
Males.....	6	12	5	7	5	3	5	6	14	8	3	1	75	
Mechanics:														
Males.....	17	11	16	14	9	6	8	18	20	11	11	1	142	
Merchants:														
Males.....		5	12	9	12	10	37	70	48	47	18		268	
Females.....		1					1		1	4				7
Milliners:														
Females.....	1	9	2	1	2	1	1	1	2					19
Miners:														
Males.....			2	2	2	2		2		1			11	
Milkmen:														
Males.....														
Manufacturers:														
Males.....		3	3	2	5	7	1	6	11	9	2		49	
Millers:														
Males.....		1	1			1	3	6	4	11	2		29	
Moulders:														
Males.....	2	7	1	4	3	5	3	4	8	6			43	
Musicians:														
Males.....			1	1		1	1	1	2				7	
Females.....	1				1	1	1	1						5
Nurses:														
Females.....	2	4	4	5	3	1	3	3	3	4	2		34	
Nuns:														
Females.....		2	1	1	1	3	2	3	2					15
Painters:														
Males.....	1	9	7	5	6	5	7	15	14	9	1		79	
Peddlers:														
Males.....		2		1				2	1	4	1		11	
Physicians:														
Males.....			1	4	1	6	2	4	16	11	2	1	48	
Plasterers:														
Males.....			1	1			2	4	2	4	1		15	
Plumbers:														
Males.....	1	1	2	1	1	2		1					9	
Printers:														
Males.....	4	3	2	7	3	4	3	4	4		3		37	
Professors:														
Males.....					1		1		1				3	
Photographers:														
Males.....	1	1						1					3	
Public Officials:														
Males.....	1	2	3	1	3	3	14	20	28	21	13		109	
Females.....				1	1	1								3
Policemen:														
Males.....			1		1	5	2	5	2	2			18	
Railway Employees:														
Males.....	6	17	29	17	13	12	11	21	16	8		1	151	
Sailors:														
Males.....	1	8	10	3	1	2	2	12	11	4	10	2	66	

TABLE No. 17.
DEATHS BY OCCUPATIONS AND AGES IN TORONTO IN 1905.

Occupations.	15-19.	20-24.	25-29.	30-34.	35-39.	40-44.	45-49.	50-59.	60-69.	70-79.	80 and over.	Not given.	Totals.	
													Males.	Females.
Agents:														
Males						3	5	6	5	4	2		25	
Artists:							1			1			2	1
Females								1						
Architects:														
Males			1										1	
Auctioneer:														
Males														
Brewers and Distillers:														
Males														
Bakers and Confectioners:														
Males		2		1		2		2					7	
Barbers:														
Males			1			1	1	2			1		6	
Butchers:														
Males			1			1	1	1	2				6	
Bartenders:														
Males			1		1	2							4	
Bookkeepers:														
Males	1	1		1	1	2	1	3	4	1			15	
Females			1											1
Bookbinders:														
Males			1				1				1		3	
Blacksmiths:														
Males			1	1	1	2	2		1	2			10	
Brickmakers:														
Males			1					1					2	
Bankers:														
Males							1						1	
Builders and Contractors:														
Males		1		1		1		1	6	1			11	
Boarding-house keepers:														
Males											1			1
Females														
Carpenters:														
Males	2	4		2	2		3	13	18	6	1		51	
Cabinetmakers:														
Males	1					1			2	2			6	
Coopers:														
Males				1				1	1				3	
Cooks:														
Males			1			1		1					3	
Females							1	2						3
Chemists and Druggists:														
Males		1						2					3	
Clergymen:														
Males		1						2	3	2	2		10	
Carriage and Wagonmakers:														
Males								2	2	3			7	
Clerks:														
Males	14	12	12	2	7	5	3	7	7				69	14
Females	3	4	3	1		1	2							
Cheesemakers:														
Males														
Cigarmakers:														
Males					1								1	
Females														
Commercial Travellers:														
Males			1	2	1	1	3	7	4	1			20	
Dentists:														
Males														
Dressmakers:														
Females				2					2	1			5	
Engineers:														
Males		1	1		1		3	1	4	2	1		15	
Electricians:														
Males		1			1	1	1	1					5	
Engravers:														
Males														
Editors, Reporters, etc.:														
Males		1	1					1	2	1			6	
Foremen and Forewomen:														
Males				1	1	1	1	3	1	1			9	
Females					1		1	1						3
Farmers:														
Males	1	1	2		2		1	5	8	15	4		39	
Furriers:														
Males	1								1				2	
Females					1									1

TABLE No. 17.—*Continued.*DEATHS BY OCCUPATIONS AND AGES IN TORONTO IN 1905.—*Continued.*

Occupations.	15-19.	20-24.	25-29.	30-34.	35-39.	40-44.	45-49.	50-59.	60-69.	70-79.	80 and over.	Not given.	Totals.	
													Males.	Females.
Factory hands:														
Males.....	12	1	1	1					1				6	
Females.....	4	3	1	3										11
Gardeners:							1	1	7	2	1		12	
Gentlemen:						1	2	6	14	37	31		91	
Hunters and Fishermen:														
Males.....			1					1		1	1		4	
Housewives:														
Females.....	2	32	44	45	56	47	45	107	161	162	100	4		805
Harness-makers and saddlers:														
Males.....														
Hotelkeepers:							1	1		1			3	
Females.....														
Laborers:														
Males.....	6	17	15	16	10	7	16	32	36	19	12	1	187	
Lumbermen:								3					3	
Lawyers:					3	1		2	2	2	1		11	
Liverymen:														
Males.....										1			1	
Laundry:														
Males.....			1	1	1								3	
Females.....	1						1							
Masons:														
Males.....		2	2	1	3	3	1	4			1		17	2
Machinists:	1	3	2		2	2	2	2	4	1	1		18	
Merchants:														
Males.....		1	2		6	2	9	17	13	6	2		58	
Females.....							1							1
Milliners:														
Female.....	1	1					1							3
Minors:														
Males.....														
Mechanics:														
Males.....	4	3	5	3	2	1	2	2	2	4	3		31	
Milkmen:														
Manufacturers:														
Males.....			1	1	2		2	2	2				10	
Millers:														
Males.....							1		1	2			4	
Moulders:														
Males.....		1		1	2			1	2				7	
Musicians:														
Males.....						1	1		2				4	
Females.....	1													1
Nurses:														
Females.....	1	1	1			1		1	2		1		8	
Nuns:														
Females.....		1		1	1	1	1		1					6
Painters:														
Males.....	1	2	2	2	1	3	2	4	4	3			24	
Pedlars:														
Males.....		1		1				1	1	2			6	
Physicians:														
Males.....			1	1			1	1	2	2			8	
Plasterers:														
Males.....				1			1	2					4	
Plumbers:														
Males.....		1	2		1								4	
Printers:														
Males.....	1	2		2	2	2	1	2	2				14	
Photographers:														
Males.....								1					1	
Public Officials:														
Males.....			1				1	2	6	4	1		15	
Females.....														
Policemen:														
Males.....						1		1		1			3	
Professors:														
Males.....					1		1		1				3	
Railway Employees:														
Males.....	1	1	5	2	4	1	1	3	3	3			24	
Sailors:														
Males.....						1		1	1		1		4	

TABLE No. 17.—Continued.

DEATHS BY OCCUPATIONS AND AGES IN TORONTO IN 1905.—Concluded.

Occupations.	15-19.	20-24.	25-29.	30-34.	35-39.	40-44.	45-49.	50-59.	60-69.	70-79.	80 and over.	Not given.	Totals.	
													Males.	Females.
Stenographers:														
Males.....														
Females.....		2												2
Servants:														
Males.....		2	2	2	2	1	3	1					11	
Females.....	2	2	3	3	3	1	8	4	7	1				40
Stonecutters:														
Males.....					1	1	2	2					6	
Students:														
Males.....	3	5	1										9	
Females.....	5	1												6
Shoemakers:														
Males.....	1	1						4	6	3	3	1	19	
Seamstresses:														
Females.....	1	2	2		1	1	1	4						12
School Teachers:														
Males.....					1	1	3	1	1				7	
Females.....					1		1		1	1				4
Surveyors:														
Males.....						1							1	
Tailors:														
Males.....		1		3	1	2	1		3	5	2		18	
Tinsmiths:														
Males.....						1	2	1		1			5	
Teamsters:														
Males.....	1	2	1	3	4	2	2	6	2	1	2		26	
Telegraph Operators:														
Males.....			1										1	
Females.....			1											1
Tanners and Curriers:														
Males.....					1								1	
Undertakers:														
Males.....														
Volunteers, Soldiers & Pensioners:														
Males.....		1	1		1			3			2		8	
Veterinary Surgeons:														
Males.....										1			1	
Watchmakers and Jewellers:														
Males.....	2	1			1			1	1	1			7	
Females.....														
Weavers:														
Males.....										1			1	
No occupation:														
Males.....	14	10	6	4	4	3	8	17	16	39	15		136	
Females.....	18	20	15	11	11	11	7	20	23	25	20			181
Totals:—Males.....	57	86	76	53	74	62	91	186	218	194	92	2	1,180	
Females.....	39	75	71	66	75	62	62	145	191	188	122	4		1,111
Totals, 15-80.....	96	161	147	119	149	124	153	331	409	382	214	6	2,29	

Under 15..... 1,310

Still-Births..... 273

Occupations and Ages not given..... 13

Grand Total..... 3,887

APPENDIX.

BIRTHS BY MONTHS, 1905. COUNTIES.

Countries.	Jan'y.	Feb'y.	March.	April.	May.	June.	July.	August.	Septem-ber.	October.	Novem-ber.	Decem-ber.	Total.	No. of Pairs of Twins.	Triplets.	Illegiti-mate.	Still born.
Algonia :																	
Males	68	59	84	64	75	63	68	70	73	72	64	60	820	22	.....	17	10
Females	50	50	58	61	75	47	49	74	60	80	55	46	705	14	.....	8	13
Total	118	109	142	125	150	110	117	144	133	152	119	106	1,525	18 pair	.....	25	23
Brant :																	
Males	38	35	41	40	35	35	38	36	37	32	27	43	437	9	.....	5	22
Females	37	37	36	39	37	28	36	36	50	32	24	30	422	17	.....	8	11
Total	75	72	77	79	72	63	74	72	87	64	51	73	859	13 pair	.....	13	33
Bruce :																	
Males	50	46	64	52	53	71	48	73	63	55	46	52	673	15	.....	6	10
Females	43	44	48	61	49	46	59	55	52	49	40	49	595	17	.....	8	15
Total	93	90	112	113	102	117	107	128	115	104	86	101	1,268	16 pair	.....	14	25
Carleton :																	
Males	91	87	98	93	119	105	113	111	105	87	109	116	1,234	15	.....	11	21
Females	81	82	102	114	121	102	90	122	114	100	88	83	1,199	25	.....	41	13
Total	172	169	200	207	240	207	203	233	219	187	197	199	2,433	20 pair	.....	85	34
Clufferin :																	
Males	12	17	20	25	21	9	12	18	20	24	18	17	213	5	.....	.....	3
Females	15	13	13	30	20	19	19	25	21	15	11	18	222	1	.....	.....	6
Total	27	30	33	55	41	28	31	43	41	39	32	35	435	3 pair	.....	.....	9
Elgin :																	
Males	30	33	36	32	41	35	35	32	40	36	31	31	412	1	.....	3	1
Females	22	22	39	38	32	41	41	35	28	25	22	29	374	5	.....	3	3
Total	52	55	75	70	73	76	76	67	68	61	53	60	786	3 pair	.....	6	4
Essex :																	
Males	62	65	78	71	80	71	75	78	64	67	59	63	833	28	.....	9	22
Females	69	58	72	59	71	55	63	77	58	59	79	62	782	24	.....	8	14
Total	131	123	150	130	151	126	138	155	122	126	138	125	1,615	26 pair	.....	12	36

Frontenac :		43	39	63	40	38	42	41	53	30	45	34	34	502	13	17	11
Males		19	29	32	34	43	31	22	33	28	33	39	33	376	7	16	7
Females		62	68	95	74	81	73	63	86	58	78	73	67	878	10 pair	33	18
Total																	
Grey :																	
Males		44	54	71	54	68	63	71	75	68	48	50	62	728	15	4	17
Females		60	57	65	77	90	35	86	55	72	69	60	58	784	21	8	9
Total		104	111	136	131	158	98	157	130	140	117	110	120	1,512	18 pair	12	26
Haldimand :																	
Males		20	19	15	20	9	16	14	20	20	10	18	13	194	3	1	1
Females		9	18	18	21	18	17	16	17	18	16	14	12	194	3	1	4
Total		29	37	33	41	27	33	30	37	38	26	32	25	388	3 pair	1	5
Haliburton :																	
Males		7	8	9	11	14	14	10	10	5	10	4	6	108	5	1	1
Females		2	4	10	15	9	11	9	9	7	2	11	6	95	5	1	.....
Total		9	12	19	26	23	25	19	19	12	12	15	12	203	5 pair	2	1
Halton :																	
Males		23	12	21	20	17	24	18	17	21	11	20	14	218	3	2	3
Females		18	15	23	23	22	19	18	17	22	22	20	11	280	5	4	3
Total		41	27	44	43	39	43	36	34	43	33	40	25	448	4 pair	6	6
Hastings :																	
Males		42	52	50	49	53	60	43	50	58	51	53	49	610	16	1	13
Females		42	37	58	60	40	48	49	39	39	55	41	30	538	20	2	14
Total		84	89	108	109	93	108	92	89	97	106	94	79	1,148	18 pair	3	27
Huron :																	
Males		46	39	52	42	48	40	28	70	62	64	42	39	572	21	4	10
Females		48	42	46	54	68	36	47	57	52	44	52	33	579	11	7	20
Total		94	81	98	96	116	76	75	127	114	108	94	72	1,151	16 pair	11	30
Kent :																	
Males		41	37	63	55	51	17	41	43	54	49	39	38	561	15	3	7
Females		37	42	65	67	60	60	55	49	54	51	45	45	630	13	4	9
Total		81	79	128	122	111	107	96	92	108	100	84	83	1,191	14 pair	7	16

Counties.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.	No. of Pairs of Twins.	Triples.	Illegitimate.	Still Born.
Lambton:																	
Males	45	56	51	46	45	49	49	56	48	60	33	49	587	13		5	18
Females	49	53	60	48	55	45	50	62	56	50	38	41	607	11		10	11
Total	94	109	111	94	100	94	99	118	104	110	71	90	1,194	24 pair		15	29
Lanark:																	
Males	19	30	31	37	28	35	28	34	34	38	27	24	365	6		2	10
Females	29	25	22	29	31	25	29	28	20	28	31	20	317	4		3	9
Total	48	55	53	66	59	60	57	62	54	66	58	44	682	10 pair		5	19
Leeds and Grenville:																	
Males	49	45	60	49	50	49	50	54	44	36	44	45	575	5		2	12
Females	37	53	50	57	46	41	51	53	48	36	38	33	543	13		1	5
Total	86	98	110	106	96	90	101	107	92	72	82	78	1,118	18 pair		9	17
Lennox and Addington:																	
Males	14	13	21	20	18	20	19	12	25	27	23	16	228	8	2		5
Females	17	11	26	21	19	23	14	12	16	16	11	17	203	4	1		4
Total	31	24	47	41	37	43	33	24	41	43	34	33	431	12 pair	3		9
Lincoln:																	
Males	28	32	21	31	37	27	32	26	36	29	27	22	348	5		6	7
Females	21	17	33	29	18	28	28	33	34	36	34	21	332	7			10
Total	49	49	54	60	55	55	60	59	70	65	61	43	680	12 pair		6	17
Middlesex:																	
Males	73	66	90	93	82	72	88	88	77	72	64	36	901	10		27	28
Females	72	74	88	87	78	76	80	74	79	78	75	68	938	16		17	27
Total	145	140	178	180	160	148	177	162	156	150	139	104	1,839	26 pair		44	55
Muskoka:																	
Males	24	27	29	21	29	26	25	33	33	23	17	26	313	10		3	12
Females	16	21	25	32	23	38	37	20	24	25	30	29	320	10		4	2
Total	40	48	54	53	52	64	62	53	57	48	47	55	633	20 pair		7	14

Nipissing :	Males	73	57	88	79	75	57	80	79	62	56	53	65	824	12	7	17
	Females	61	53	88	76	78	59	66	57	71	61	55	59	784	14	5	10
	Total	134	110	176	155	153	116	146	136	133	117	108	124	1,608	13 pair	12	27
Norfolk :	Males	25	14	32	26	19	21	29	28	36	24	25	23	302	8	3	5
	Females	13	7	25	31	26	25	30	38	27	14	26	15	277	4	5	5
	Total	38	21	57	57	45	46	59	66	63	38	51	38	579	6 pair	8	10
Northumberland and Dorham :	Males	39	40	48	56	50	41	58	73	54	54	45	32	500	11	2	22
	Females	33	40	55	54	40	45	54	50	56	36	32	36	531	8	7	14
	Total	72	80	103	110	90	86	112	123	110	90	77	68	1,121	11 pair	9	36
Ontario :	Males	31	23	46	36	39	23	36	41	33	40	32	27	407	.....	.....	.....
	Females	33	29	48	30	45	38	31	30	40	23	26	18	391	.....	.....	.....
	Total	64	52	94	66	84	61	67	71	73	63	58	45	798	.....	.....	.....
Oxford :	Males	36	46	54	52	53	42	47	73	43	37	37	35	555	8	3	5
	Females	36	26	39	41	41	36	43	50	41	37	27	29	446	6	5	6
	Total	72	72	93	93	94	78	90	123	84	74	64	64	1,001	7 pair	8	11
Perry Sound :	Males	35	28	24	24	30	25	26	23	21	17	23	27	306	.....	.....	.....
	Females	26	22	44	39	39	27	31	25	21	21	25	28	351	.....	.....	.....
	Total	61	50	68	63	69	52	57	48	45	41	48	55	657	.....	.....	.....
Peel :	Males	12	19	26	10	18	21	30	8	25	21	10	4	204	5	2	2
	Females	16	11	17	12	17	9	10	23	20	13	16	9	173	3	.....	.....
	Total	28	30	43	22	35	30	40	31	45	34	26	13	377	4 pair	2	1
Perth :	Males	19	38	57	50	46	35	59	42	43	45	36	30	530	10	6	8
	Females	29	33	42	43	38	41	53	45	60	35	41	43	503	6	2	11
	Total	78	71	99	93	84	76	112	87	103	80	77	72	1,033	8 pair	8	19

BIRTHS BY MONTHS, 1905—COUNTIES.—Continued.

Counties.	Jan'y.	Feb'y.	March.	April.	May.	June.	July.	August.	Septem-ber.	October.	Novem-ber.	Decem-ber.	Total.	No. of Pair of Twins.	Triplets.	Illegiti- mate.	Still Born.
Peterboro' :																	
Males	28	22	42	29	39	56	41	32	36	39	32	40	436	4	.....	.....	2
Females	33	27	38	29	56	30	30	35	45	33	39	21	114	4	.....	.....	15
Total	61	49	80	58	95	86	71	65	81	72	71	61	550	4 pair	.....	.....	21
Prescott and Russell :																	
Males	83	86	105	90	96	107	78	84	60	80	50	92	1,011	25	.....	.....	7
Females	63	61	89	91	79	88	93	79	81	75	54	86	839	11	.....	.....	9
Total	146	147	194	181	175	195	171	163	141	155	104	178	1,850	18 pair	.....	.....	16
Prince Edward :																	
Males	16	7	6	14	12	12	13	17	15	9	11	17	149	.....	.....	.....	1
Females	10	10	18	11	10	10	11	24	9	13	11	10	147	2	.....	.....	5
Total	26	17	24	25	22	22	24	41	24	22	22	27	296	1 pair	.....	.....	9
Rainy River :																	
Males	17	13	14	16	13	17	20	14	18	13	13	17	185	1	.....	.....	3
Females	19	11	18	11	13	21	9	19	10	12	12	13	171	3	.....	.....	1
Total	36	24	32	30	26	38	29	33	28	25	25	30	356	2 pair	.....	.....	4
Renfrew :																	
Males	70	59	72	66	69	61	70	75	56	63	62	69	745	17	.....	.....	20
Females	41	62	66	67	57	62	62	69	68	50	48	61	713	21	.....	.....	15
Total	111	121	138	133	126	126	132	144	124	113	110	130	1,508	19 pair	.....	.....	35
Simcoe :																	
Males	76	90	88	84	90	97	86	72	79	78	70	72	982	23	.....	.....	25
Females	76	52	100	82	89	90	92	93	81	81	83	85	1,004	17	.....	.....	29
Total	152	142	188	166	179	187	178	165	160	159	153	157	1,986	29 pair	3 cases	.....	54
Stormont, Dundas & Glen :																	
Males	57	58	70	77	65	81	63	69	58	69	58	65	790	28	.....	.....	23
Females	60	54	56	72	64	68	62	69	65	71	63	47	741	20	.....	.....	16
Total	117	112	126	149	119	149	125	138	123	140	121	112	1,531	24 pair	.....	.....	39

Thunder Bay :	18	22	19	18	41	38	23	15	27	24	27	19	20	203	7	4
Males	16	18	14	23			14	23	28	12	28	19	25	258	9	4
Females	34	40	33				37	38	55	36	55	38	45	501	8 pair	8
Total																
Victoria :	22	36	36	39	22	29	43	26	33	39	33	18	24	375	9	12
Males	27	21	37	22			27	29	36	17	36	21	14	310	5	6
Females																
Total	49	57	73	61	55	70		68	69	56	69	39	38	685	7 pair	18
Waterloo :	59	39	71	52	57	55		78	49	41	49	51	67	675	13	11
Males	43	49	60	56	52	49		52	57	57	64	48	50	652	11	18
Females																
Total	102	88	131	108	109	104		130	113	98	113	99	117	1,327	12 pair	29
Welland :	33	21	34	84	32	34		40	23	27	23	32	24	371	7	18
Males	20	32	30	29	37	35		31	38	38	29	22	19	357	11	12
Females																
Total	53	53	64	63	69	69		71	52	65	52	54	43	728	9 pair	30
Wellington :	34	35	49	44	52	45		51	42	43	42	47	36	533	18	17
Males	40	33	58	41	49	48		45	42	50	42	40	41	532	12	17
Females																
Total	74	68	107	85	101	93		96	84	93	84	87	77	1,065	15 pair	34
Wentworth :	94	58	109	65	72	97		91	86	77	86	78	80	1,008	8	37
Males	94	85	79	87	78	90		81	82	75	82	69	66	957	10	27
Females																
Total	188	143	188	152	150	187		175	168	152	168	147	116	1,965	9 pair	64
York :	316	309	378	366	381	350		361	293	333	293	273	291	3,994	87	105
Males	235	280	297	321	327	320		368	274	311	274	272	242	3,578	75	78
Females																
Total	551	589	675	687	708	670		729	567	644	567	545	533	7,572	81 pair	183
Total Males	2,095	1,991	2,536	2,292	2,360	2,319		2,369	2,144	2,243	2,144	1,924	2,012	26,717	547	537
Total Females	1,817	1,820	2,307	2,337	2,302	2,103		2,268	2,031	2,207	2,031	1,910	1,791	25,194	505	506
Grand Total	3,912	3,811	4,843	4,619	4,662	4,422		4,637	4,198	4,450	4,198	3,834	3,803	51,911	526 pair	1,103

BIRTHS BY MONTHS, 1905—CITIES.

Cities.	Jan'y.	Feb'y.	March.	April.	May.	June.	July.	August.	Septem-ber.	October.	Novem-ber.	Decem-ber.	Total.	No. of Pairs of Twins.	Triples.	Illegiti-mate.	Still Born.
Toronto :																	
Males	247	234	294	291	302	266	264	270	247	223	210	234	3,082	72		2	74
Females	178	209	230	254	242	249	296	246	232	206	216	186	2,744	62		1	58
Total	425	443	524	545	544	515	560	516	479	429	426	420	5,826	67 pair	1 case	220	132
Hamilton :																	
Males	65	55	68	51	49	68	62	73	63	49	50	60	713	2		1	27
Females	74	59	55	57	58	60	54	52	55	57	45	35	661	2		4	21
Total	139	114	123	108	107	128	116	125	118	106	95	95	1,374	2 pair		5	48
Ottawa :																	
Males	73	69	69	75	81	72	81	83	75	65	85	81	909	11		43	9
Females	57	63	84	83	97	71	69	78	88	69	59	64	882	15		52	6
Total	130	132	153	158	178	143	150	161	163	134	144	145	1,791	13 pair		95	15
London :																	
Males	40	42	43	48	34	40	41	44	37	33	29	16	447	2		24	27
Females	36	33	36	41	36	31	36	37	35	30	40	38	432	2		21	24
Total	76	75	79	89	70	74	77	81	72	63	69	54	879	2 pair		45	51
Kingston :																	
Males	22	19	27	22	19	26	26	21	12	26	17	22	259	9		10	7
Females	17	16	10	19	23	13	9	13	8	15	17	19	179	3		10	4
Total	39	35	37	41	42	39	35	34	20	41	34	41	438	6 pair		20	11
Brantford :																	
Males	24	21	24	23	19	19	18	22	19	14	10	21	234	6		2	22
Females	19	18	26	26	21	19	23	19	27	21	13	16	248	8		4	14
Total	43	39	50	49	40	38	41	41	46	35	23	37	482	7 pair		6	36
St. Thomas :																	
Males	8	12	16	10	21	11	11	12	13	9	11	8	142				
Females	8	5	14	11	12	17	13	8	6	8	11	12	125			2	
Total	16	17	30	21	33	28	24	20	19	17	22	20	267			2	

Guelph :	11	14	8	9	15	11	9	8	10	10	16	11	132	5	2	4
Males	9	5	12	10	19	12	16	11	13	14	8	14	143	3	3	6
Females	20	19	20	19	34	23	25	19	23	24	24	25	275	4 pair	5	10
Total																
St. Catharines :																
Males	11	14	9	18	10	13	9	12	16	10	13	10	145	.....	4	3
Females	5	6	9	11	11	12	8	9	3	17	14	11	116	.....	.....	6
Total	16	20	18	29	21	25	17	21	19	27	27	21	261	1 pair	4	9
Belleville :																
Males	5	9	9	5	6	7	6	7	5	5	7	8	79	3	.....	5
Females	9	6	10	6	6	7	6	4	2	8	3	1	68	1	.....	2
Total	14	15	19	11	12	14	12	11	7	13	10	9	147	2 pair	.....	7
Stratford :																
Males	11	5	14	16	10	3	15	5	10	9	6	6	110	4	.....	1
Females	6	10	8	8	11	11	13	8	13	8	9	10	112	2	.....	1
Total	17	15	22	24	18	14	28	13	23	17	15	16	222	3 pair	.....	2
Windsor :																
Males	16	13	10	10	19	14	22	19	9	8	12	11	163	5	.....	6
Females	19	13	15	11	6	14	12	14	9	11	7	11	142	5	.....	3
Total	35	26	25	21	25	28	34	33	18	19	19	22	305	5 pair	.....	9
Chatham :																
Males	5	6	9	8	8	9	12	8	9	5	4	2	85	4	.....	1
Females	8	10	9	7	8	8	9	3	8	4	4	3	81	2	.....	.....
Total	13	16	18	15	16	17	21	11	17	9	8	5	166	3 pair	.....	.....
Woodstock :																
Males	8	14	8	12	5	11	13	13	11	8	6	9	118	2	.....	4
Females	7	5	9	6	9	4	7	12	12	6	4	3	84	.....	.....	.....
Total	15	19	17	18	14	15	20	25	23	14	10	12	202	1 pair	.....	4
Peterboro :																
Males	11	10	14	8	14	27	14	14	14	14	15	20	175	1	.....	6
Females	14	8	19	13	23	13	15	15	17	12	17	7	175	1	.....	8
Total	25	18	33	23	37	40	29	29	31	26	32	27	350	1 pair	.....	14
Total Males	557	537	622	606	612	597	603	611	560	488	491	519	6,793	126	2	195
Total Females	466	466	546	565	579	544	586	529	528	486	467	430	6,192	108	1	153
Grand Total	1,023	1,003	1,168	1,171	1,191	1,141	1,189	1,140	1,078	974	958	949	12,985	117 pair	1 case	348

Counties.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
Algoma	36	19	33	22	32	65	35	48	44	49	40	41	464
Brant	18	22	16	28	17	49	17	15	37	35	30	30	314
Bruce	32	40	37	34	16	58	18	19	21	33	35	46	389
Carleton	66	42	59	53	93	125	77	74	114	92	89	55	939
Dufferin	8	12	18	5	7	28	7	6	9	5	14	22	141
Elgin	36	27	20	23	19	39	27	21	43	37	35	42	369
Essex	122	111	143	125	148	195	160	214	211	180	165	137	1,911
Frontenac	27	18	13	23	28	40	28	29	32	30	23	33	324
Grey	38	45	37	34	28	78	28	33	44	40	50	87	542
Halldinand	12	9	5	10	12	37	8	13	20	21	9	26	182
Halton	17	5	11	15	9	26	5	6	11	14	12	16	147
Haliburton	1	1	2	5	2	1	3	2	6	1	1	2	27
Hastings	41	35	37	42	19	57	21	33	41	44	38	55	466
Huron	25	25	30	21	25	72	15	20	40	39	45	62	429
Kent	37	26	20	30	25	35	21	30	36	41	47	56	403
Laubton	36	28	25	33	31	68	24	29	54	61	39	54	485
Lanark	16	18	19	17	19	34	12	15	35	24	26	25	268
Leeds and Grenville	25	33	29	36	24	52	16	51	35	37	39	46	445
Lennox and Addington	12	7	8	12	11	24	12	13	23	21	12	25	180
Lincoln	18	24	14	9	19	26	14	9	23	26	30	25	237
Middlesex	49	46	48	71	43	118	53	60	95	57	65	94	799
Muskoka	9	8	12	11	15	16	20	18	20	15	8	20	172
Nipissing	31	17	22	15	35	39	28	29	24	26	35	11	312

Norfolk.....	10	13	18	20	16	20	9	10	21	28	22	25	212
Northumberland and Durham	23	38	37	26	23	52	28	38	44	37	42	55	453
Ontario	17	22	17	14	22	23	8	20	23	29	22	45	262
Oxford	19	20	32	27	20	59	23	24	32	36	29	49	370
Parry Sound	14	4	20	12	12	27	10	16	14	11	8	23	171
Peel.....	15	11	12	9	7	17	9	4	16	11	13	20	144
Perth	21	20	29	26	19	65	22	19	44	53	41	47	406
Peterboro	22	24	23	17	14	44	21	20	35	36	22	41	319
Prescott and Russell	39	22	19	8	36	62	45	29	36	36	34	9	375
Prince Edward	11	10	9	10	6	11	10	11	13	11	15	14	131
Rainy River	10	5	8	10	7	11	12	14	10	14	20	11	132
Renfrew.....	23	18	23	18	28	50	40	26	45	47	37	27	382
Simcoe	40	39	59	39	33	102	44	50	70	40	60	84	660
Stormont, Dundas and Glengarry	37	30	25	21	28	53	32	35	75	48	63	38	485
Thunder Bay	15	8	11	12	19	18	15	16	16	28	18	20	196
Victoria	14	11	19	22	11	34	9	15	33	14	15	21	218
Waterloo.....	23	17	30	28	41	67	32	34	39	38	33	40	422
Welland.....	15	22	27	25	33	40	26	36	45	32	36	32	369
Wellington	36	30	28	23	30	77	24	15	41	27	35	41	407
Wentworth	38	44	47	65	44	139	64	52	106	91	65	85	840
York.....	208	199	174	231	188	535	249	307	409	344	323	364	3,551
Total	1,372	1,234	1,325	1,337	1,314	2,788	1,384	1,578	2,211	1,942	1,840	2,101	20,126

MARRIAGES BY DENOMINATIONS AND AGES, 1905.

Religious denomination of bride and bridegroom.														How Married.		Totals.	Counties.	Under 20 years of age.	From 25 to 29 years.	From 30 to 34 years.	From 35 to 39 years.	From 40 to 44 years.	From 45 to 49 years.	From 50 to 54 years.	From 55 to 59 years.	From 60 to 64 years.	From 65 to 69 years.	70 years and over.	Ages not given.
Religious denomination of bride and bridegroom.														How Married.															
Episcopalian.	Presbyterian.	Methodist.	Roman Catholic.	Baptist.	Congregationalist.	Lutheran.	Evangelical Association.	Quakers.	Mennonites.	Other denominations.	No denomination given.	License.	Banns.																
Males.....	61	127	97	142	11	1	6	.....	.....	4	3	.....	661	Algonia	18	10	10	1	1	3	2	3	3			
Females.....	65	123	89	132	18	1	6	.....	.....	5	5	.....	661	Algonia	9	4	4	.....	.....	1	1	1	5	
Total.....	129	250	186	274	29	2	12	.....	.....	9	8	367	928	Algonia	27	14	14	1	1	4	3	4	8				
Males.....	60	117	118	119	52	7	.....	.....	.....	7	3	.....	311	Algonia	23	8	8	4	1	1	.....	.....	.....			
Females.....	53	57	101	22	61	10	.....	.....	.....	6	1	.....	311	Algonia	10	5	5	2	.....	.....	.....	.....	.....	
Total.....	113	174	219	141	113	17	.....	.....	.....	13	4	301	622	Algonia	33	13	13	6	1	1	.....	.....	.....			
Males.....	43	135	106	47	22	1	9	.....	.....	10	2	.....	389	Algonia	26	11	11	5	2	1	1	3	5			
Females.....	38	137	105	46	29	1	9	.....	.....	11	2	.....	389	Algonia	12	5	5	2	.....	.....	.....	.....	.....	
Total.....	81	272	211	93	51	2	18	.....	.....	21	4	315	778	Algonia	38	16	16	7	2	2	1	3	8				
Males.....	168	186	110	333	26	10	16	.....	.....	28	2	.....	939	Algonia	60	23	23	15	19	11	9	5	3			
Females.....	185	161	165	115	28	5	13	.....	.....	22	2	.....	939	Algonia	33	11	11	17	9	4	3	1	13			
Total.....	353	347	275	448	54	15	29	.....	.....	50	4	691	1,878	Algonia	102	34	34	32	28	15	12	6	16				
Males.....	21	49	57	3	1	1	.....	.....	.....	9	.....	.....	141	Algonia	16	5	5	1	1	1	.....	.....	.....			
Females.....	32	38	55	1	5	1	.....	.....	.....	9	.....	.....	141	Algonia	4	2	2	.....	.....	.....	.....	.....	.....
Total.....	53	87	112	4	6	2	.....	.....	.....	18	.....	139	282	Algonia	20	7	7	1	2	1	.....	.....	.....			
Males.....	37	75	147	15	67	1	1	.....	.....	15	6	.....	369	Algonia	34	13	13	7	4	3	4	1	1			
Females.....	15	60	119	13	63	3	1	.....	.....	25	3	.....	369	Algonia	20	5	5	5	2	3	1	1	5			
Total.....	52	135	266	28	130	4	2	.....	.....	40	9	362	738	Algonia	54	18	18	12	6	6	5	2	6				

Males.....	238	248	540	366	184	56	126	13	1	124	16	.....	1,911	.....	{ Essex.....	61	770	473	239	169	72	61	31	23	8	4	1
Females....	210	243	570	392	151	40	147	15	1	105	7	.....	1,911	.....	{ Essex.....	457	726	331	149	107	41	36	14	6	4	2	1
Total.....	478	491	1,110	758	335	95	273	28	2	229	23	1,810	3,822	.....	{ Essex.....	518	1,496	804	388	276	113	97	45	29	7	6	5
Males.....	69	44	147	41	3	7	.....	.....	.....	9	1	.....	324	.....	{ Frontenac....	9	110	108	39	26	11	4	3	2	1	2	9
Females....	69	18	144	44	7	3	2	.....	.....	7	.....	.....	324	.....	{ Frontenac....	70	127	74	20	9	6	4	1	2	.....	.....	11
Total.....	138	92	291	88	10	10	2	.....	.....	16	1	291	648	.....	{ Frontenac....	79	237	182	59	35	17	8	4	4	1	2	20
Males.....	65	173	172	21	35	32	5	1	3	19	16	542	{ Grey.....	3	161	197	77	58	17	6	7	3	5	2	1
Females....	65	180	155	25	35	30	7	1	4	30	10	542	{ Grey.....	82	235	121	41	19	11	3	1	1	2	2	18
Total.....	130	353	327	46	70	62	12	2	7	49	26	525	1,084	{ Grey.....	85	399	321	121	77	28	9	8	4	7	4	1
Males.....	32	32	75	3	18	9	3	9	1	182	{ Halton.....	1	65	53	41	10	2	4	1	2	1
Females....	38	21	74	3	22	4	1	13	5	182	{ Halton.....	37	80	37	11	6	5	1	1
Total.....	70	53	149	6	40	13	4	22	6	174	364	{ Halton.....	38	148	90	55	16	7	4	2	2	1	1
Males.....	21	53	51	4	5	2	1	.....	.....	3	.....	.....	147	.....	{ Halton.....	4	35	47	28	9	12	4	2	2	1	.....	1
Females....	34	46	59	5	.....	1	.....	.....	.....	2	.....	.....	147	.....	{ Halton.....	18	51	22	30	11	8	.....	1	.....	1	.....	5
Total.....	58	99	113	9	5	3	1	1	.....	5	.....	143	294	.....	{ Halton.....	22	86	69	58	20	20	4	3	2	2	.....	1
Males.....	6	6	14	.....	.....	.....	.....	.....	.....	1	.....	.....	27	.....	{ Halburton....	1	9	10	2	1	.....	.....	1	2	.....	1	.....
Females....	10	3	12	.....	.....	.....	.....	.....	.....	1	.....	.....	27	.....	{ Halburton....	12	5	6	2	.....	.....	2	.....	.....	.....	.....	.....
Total.....	16	9	26	.....	.....	.....	.....	.....	.....	2	.....	27	54	.....	{ Halburton....	13	14	16	4	1	.....	2	1	2	.....	1	.....
Males.....	69	59	250	63	2	.....	.....	.....	.....	16	3	.....	166	.....	{ Hastings....	7	146	167	60	32	13	8	9	8	11	1	1
Females....	87	48	239	65	5	.....	.....	.....	.....	13	6	.....	166	.....	{ Hastings....	94	246	93	24	11	8	6	6	5	1	1	2
Total.....	156	107	489	128	7	.....	.....	.....	.....	29	9	411	332	.....	{ Hastings....	101	356	260	84	43	21	14	15	13	12	2	3
Males.....	36	154	163	35	11	2	12	11	.....	3	.....	.....	129	.....	{ Huron.....	3	89	173	73	41	21	8	4	10	3	2	2
Females....	46	152	164	32	6	3	13	11	2	.....	.....	.....	129	.....	{ Huron.....	50	147	113	40	20	9	6	4	2	1	.....	5
Total.....	82	306	327	67	17	5	25	22	1	3	.....	393	258	.....	{ Huron.....	53	236	286	114	61	30	14	8	12	4	2	3
Males.....	49	85	152	61	36	1	4	.....	.....	7	8	.....	403	.....	{ Kent.....	21	118	130	64	28	17	5	6	3	.....	2	2
Females....	53	81	146	62	44	3	.....	.....	.....	9	5	.....	403	.....	{ Kent.....	118	112	88	35	16	5	6	3	1	1	.....	20
Total.....	102	166	298	123	80	4	4	.....	.....	16	13	356	806	.....	{ Kent.....	139	230	218	97	44	22	11	9	4	1	2	3

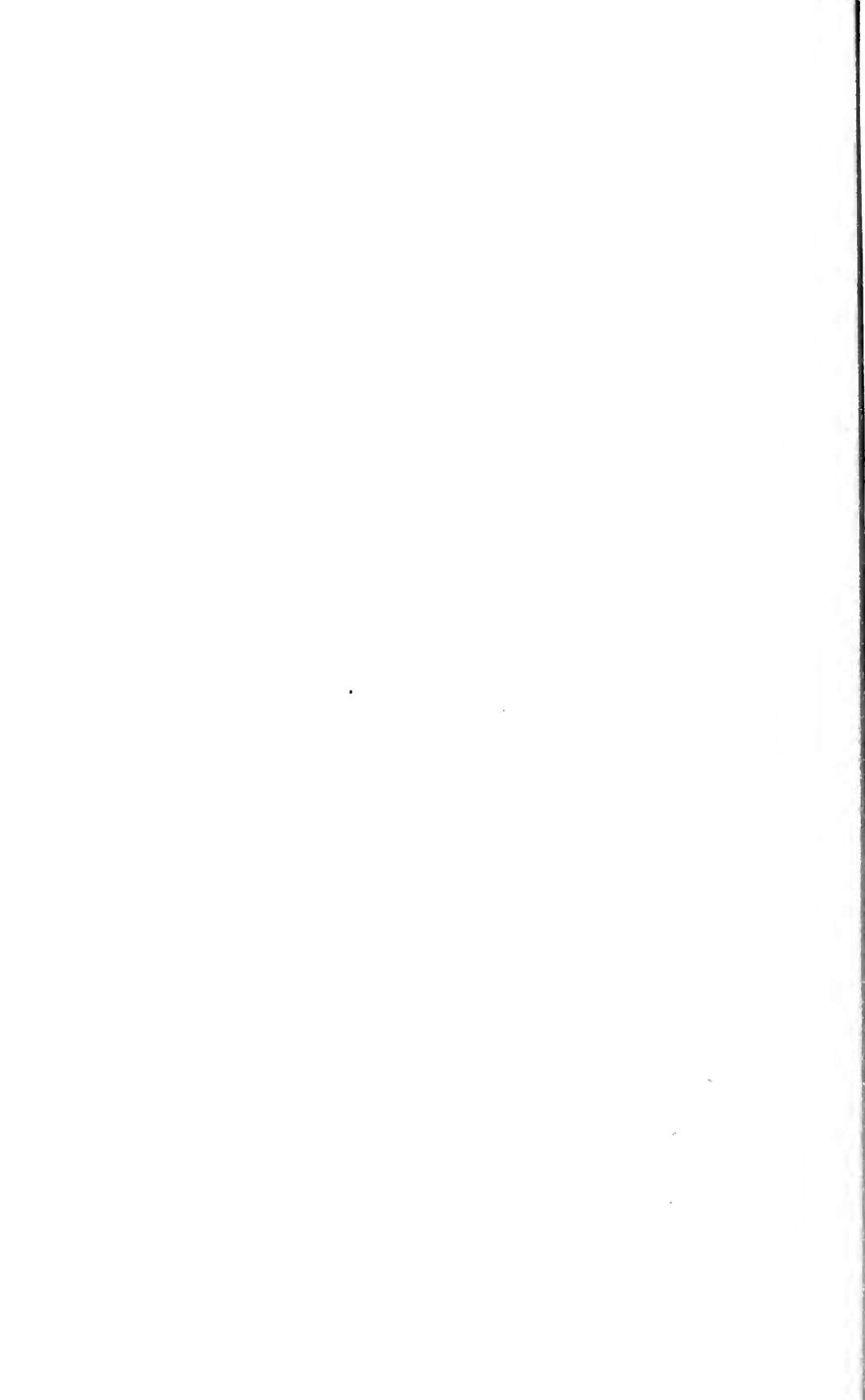
MARRIAGES BY DENOMINATIONS AND AGES. — *Continued.*

Sex.	Religious Denomination of bride and bridegroom.										How married.		Totals.	Counties.	Ages.										Ages not given.	
	Episcopali-ans.	Presbyteri-ans.	Methodists.	Roman Catho-lic.	Baptists.	Congrega-tion-ists.	Lutherans.	Evangelical Association.	Quakers.	Mennonites.	Other denomina-tions.	No denomina-tion given.			License.	Banns.	From 20 to 24 years.	From 25 to 29 years.	From 30 to 34 years.	From 35 to 39 years.	From 40 to 44 years.	From 45 to 49 years.	From 50 to 54 years.	From 55 to 59 years.		From 60 to 64 years.	From 65 to 69 years.	70 years and over.
Males.....	63	115	199	27	43	13	8	1	1	1	10	5			117	117	83	36	16	13	5	6	7	2	1	
Females....	64	105	198	35	50	17	1	1	1	1	8	4			140	122	40	52	9	6	13	4	1	1	1	
Total.....	127	220	397	62	93	30	9	2	2	2	18	9	472	13	257	239	123	64	25	19	13	10	8	3	2	
Males.....	49	96	64	27	10	5					4	5			69	87	38	32	10	5	5	1				2
Females....	50	86	63	29	18	6					1	1			92	70	35	4	3	2	3					10
Total.....	99	182	133	56	28	11					5	6	244	16	161	157	73	36	13	7	7	1				12
Males.....	101	87	176	58	11	2	1				6	4			128	154	62	33	16	11	4					5
Females....	98	66	188	70	20	1					4	2			110	88	27	16	12	6	5	2				10
Total.....	199	153	364	128	31	3	1				10	6	413	36	231	242	89	49	28	17	9	4	7	4	3	15
Males.....	18	17	134	8							3				60	49	29	13	5		5	2				
Females....	21	14	131	10							3	1			60	27	10	10	1	3	3					
Total.....	39	31	265	18							6	1	173	7	124	76	39	23	6	8	8	2	3	1		
Males.....	49	53	71	17	25	1	1	2	3	12	3				81	77	27	18	6	7	3	1	2	2	1	1
Females....	53	46	78	22	22		1	6	2	7					69	85	38	21	10	3	5	2	1			3
Total.....	102	99	149	39	47	1	2	8	5	19	3		223	14	106	115	48	28	9	12	5	2	2	2	1	4
Males.....	166	175	295	44	80	6	7			1	18	7			23	215	270	133	61	43	21	11	8	3	3	5
Females....	177	158	295	43	81	6	3				24	12			159	260	202	79	32	25	7	5	6	1	1	22
Total.....	343	333	590	87	161	12	10			1	42	19	782	17	382	475	472	212	93	68	28	16	14	4	4	27

MARRIAGES BY DENOMINATIONS AND AGES, 1905.—*Concluded.*

Sex.	Religious Denominations of bride and bridegroom.												Totals.	Counties.	Ages.												
	How married.														Under 20 years of age.	From 20 to 24 years.	From 25 to 29 years.	From 30 to 34 years.	From 35 to 39 years.	From 40 to 44 years.	From 45 to 49 years.	From 50 to 54 years.	From 55 to 59 years.	From 60 to 64 years.	From 65 to 69 years.	70 years and over.	Ages not given.
	Episcopians.	Presbyterians.	Methodists.	Roman Catholic.	Baptists.	Congregation- alists.	Lutherans.	Evangelical Association.	Quakers.	Mennonites.	Other denomina- tions.	No denomina- tion given.																License.	Banns.
Males.....	56	57	112	68	17	.....	2	.....	.....	.....	.....	.....	.....	.....	9	86	116	56	27	13	5	2	2	1	1	1	.....
Females.....	58	58	106	66	24	.....	.....	.....	.....	.....	.....	.....	.....	.....	82	107	82	27	10	3	1	1	1	1	1	1	3
Total.....	114	115	218	134	41	.....	2	.....	.....	14	.....	.....	62	.....	91	193	198	83	37	16	6	3	3	3	2	2	4
Males.....	17	30	9	303	12	1	1	.....	.....	.....	.....	2	.....	.....	26	155	110	33	21	12	7	4	2	1	1	2	2
Females.....	17	26	8	304	11	.....	1	.....	.....	4	.....	2	.....	.....	152	127	57	11	4	7	4	1	2	.....	.....	9	9
Total.....	34	56	17	607	23	1	2	.....	.....	4	.....	4	104	274	178	282	167	44	25	20	11	5	4	1	1	2	11
Males.....	25	5	91	3	2	1	1	.....	.....	1	.....	2	.....	.....	7	51	45	10	2	7	2	4	2	1	1	.....	2
Females.....	16	5	104	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	48	40	25	9	2	2	1	1	.....	.....	.....	2	2
Total.....	41	10	195	4	3	1	1	.....	.....	2	.....	4	130	1	55	91	70	19	4	9	3	5	2	1	1	1	2
Males.....	30	40	16	26	8	1	7	.....	.....	3	1	.....	.....	.....	1	28	54	31	8	5	3	1	.....	.....	.....	1	1
Females.....	30	30	21	27	7	.....	13	.....	.....	.....	.....	1	.....	.....	42	44	28	6	7	2	.....	.....	.....	.....	.....	3	3
Total.....	60	70	40	53	15	1	20	.....	.....	3	2	113	19	264	43	72	82	37	15	7	3	1	.....	.....	.....	4	4
Males.....	40	78	55	133	25	.....	28	8	.....	5	10	.....	.....	.....	15	114	148	51	23	6	10	5	2	.....	.....	5	5
Females.....	45	78	45	139	26	.....	35	6	.....	4	1	.....	.....	.....	105	141	85	27	9	3	4	1	.....	.....	.....	7	7
Total.....	85	156	100	272	51	.....	63	14	.....	9	11	256	126	764	120	255	233	81	32	9	14	6	2	.....	.....	12	12
Males.....	132	146	225	106	22	5	.....	.....	.....	2	18	4	.....	.....	15	190	255	102	41	25	15	7	2	6	1	1	1
Females.....	122	149	233	107	27	5	.....	.....	.....	4	11	2	.....	.....	172	227	156	50	24	12	3	4	1	4	.....	10	10
Total.....	254	295	458	213	49	10	.....	.....	.....	6	29	6	573	87	1,320	187	417	152	65	37	18	8	6	2	1	1	10

Males.....	52	138	100	162	5	2	12	.....	12	2	.....	485	Stormont, D.,	36	145	148	59	47	22	11	3	6	4	2	2
Females....	44	131	115	167	4	2	6	.....	6	6	.....	485	and G.,	139	172	166	32	20	7	6	2	2	1	.....	
Total	96	269	215	329	9	4	23	.....	17	8	348	970		175	317	244	91	67	29	17	5	8	5	10	
Males.....	19	38	39	60	11	.....	27	.....	2	.....	.....	196	Thunder Bay	8	52	79	33	9	9	2	3	1	.....	.....
Females....	23	32	35	56	9	.....	34	.....	3	4	.....	196		65	69	56	15	4	4	2	.....	.....	1		
Total	42	70	74	116	20	.....	61	.....	5	4	158	382		73	121	115	48	13	13	4	3	1	.....	1	
Males.....	28	47	105	21	8	.....	.....	.....	6	2	.....	218	Victoria	7	66	74	41	16	6	4	1	2	.....	1	
Females....	29	45	99	24	11	.....	.....	.....	5	4	.....	218		48	90	50	19	6	.....	.....	1	1	.....	3	
Total	57	92	204	45	19	.....	.....	.....	11	6	197	436		55	156	124	60	22	6	1	2	3	.....	4	
Males.....	24	86	66	72	21	1	85	15	32	12	8	.....	422	Waterloo	18	115	171	58	32	7	9	3	5	1	2
Females....	23	74	64	74	14	.....	106	25	25	12	5	.....	422		70	160	113	38	15	5	6	2	3	.....	
Total	47	160	130	146	35	1	191	40	57	24	13	330	844		88	275	284	96	47	12	15	5	8	1	12	
Males.....	70	52	111	45	32	3	16	6	4	3	19	8	369	Welland	10	108	111	61	34	18	8	3	1	1	2
Females....	77	56	107	42	27	2	19	5	5	18	11	.....	369		75	115	96	46	18	6	2	3	1	1	5
Total	147	108	218	87	59	5	35	11	1	8	37	19	341	738		85	223	207	110	52	24	10	11	4	2	
Males.....	49	160	105	44	18	7	5	1	2	15	1	67	Wellington	5	110	139	69	41	17	11	3	1	6	1	3
Females....	45	142	119	41	20	7	8	2	1	16	3	.....	67		55	149	125	48	12	11	3	1	2	.....	5
Total	94	302	224	85	38	14	13	3	3	31	4	368	814		60	250	264	117	53	28	14	7	3	6	3	
Males.....	171	182	283	90	62	7	9	2	32	2	840	Wenworth	39	285	276	114	41	36	21	10	3	4	1	6
Females....	168	168	274	96	68	11	6	2	.....	40	7	.....	840		200	285	197	79	30	20	12	5	2	3	1
Total	339	350	557	186	130	18	15	4	.....	72	9	800	1,680		229	570	473	181	71	56	33	15	5	7	2
Males.....	1,046	681	992	329	227	36	35	4	1	13	138	25	3,531	York	139	1,111	1,178	489	261	136	74	55	22	20	14
Females....	1,056	660	947	357	241	41	32	2	1	12	151	35	.....	3,531		683	1,252	948	392	165	80	34	15	16	7
Total	2,102	1,341	1,940	686	468	77	67	6	8	25	292	60	3,318	7,062		822	2,365	2,101	791	416	216	108	70	38	27	
Males.....	3,558	4,328	6,365	3,479	1,305	183	534	100	17	76	630	161	20,426	Grand Total	669	6,388	6,709	3,048	1,561	741	450	277	151	137	71
Females....	3,608	4,064	6,333	3,306	1,376	181	570	119	12	68	624	165	.....	20,426		4,560	7,481	4,673	1,676	800	395	231	130	80	49
Total	7,146	8,392	12,698	6,485	2,681	374	1,104	219	29	144	1,254	326	18,169	40,852		5,229	13,869	11,472	4,664	2,361	1,137	681	407	231		



[illegible]

VII. GENITO-URINARY SYSTEM.									
1. Acute Nephritis.....	1	2	1	1	1	1	1	1	1
2. Bright's Disease.....	5	1	6	4	2	1	1	1	1
3. Discharges of the Bladder.....	2	1	1	1	1	1	1	1	1
4. Ovarian Cysts and other Ovarian Tumors.....	1	1	1	1	1	1	1	1	1
Total.....	8	4	9	2	1	5	4	3	1
VIII. PUERPERAL DISEASES.									
1. Puerperal Septicæmia.....	2	5	2	3	1	1	1	1	1
2. Puerperal Albuminuria and Convulsions.....	5	5	5	1	4	1	1	1	1
Total.....	7	10	7	4	2	2	2	2	2
IX. THE SKIN.									
(No Deaths in this Class).									
X. LOCOMOTOR SYSTEM.									
1. Disease of Bones and Joints.....	2	1	3	3	1	2	1	1	1
Total.....	2	1	3	3	1	2	1	1	1
XI. MALFORMATIONS, ETC.									
1. Still-Births.....	18	15	31	34	34	34	34	34	34
2. Congenital Deformity and Malformations.....	34	22	56	56	56	56	56	56	56
3. Senile Decay.....	39	36	75	75	75	75	75	75	75
Total.....	91	73	109	55	1	104	55	3	165
XII. SUICIDE.									
1. Poison.....	1	1	2	1	1	1	1	1	1
2. Strangulation.....	2	2	2	2	2	2	2	2	2
Total.....	3	3	4	3	3	3	3	3	3
XIII. ACCIDENTS.									
1. Fractures and Dislocations.....	6	1	7	3	6	2	1	1	2
2. Drowning.....	6	2	2	2	5	1	1	1	1
3. Burns and Scalds.....	2	2	4	1	1	1	1	1	1
4. Other Accidents.....	8	2	6	3	1	5	4	1	10
Total.....	20	5	14	8	3	16	8	1	25
XIV. ILL-DEFINED CAUSES.									
1. Tumors.....	1	1	1	1	1	1	1	1	1
2. Other Ill-defined Causes.....	5	5	5	4	7	2	1	1	13
3. Heart Failure.....	6	5	5	4	3	8	1	1	11
4. Tetanus.....	1	1	1	1	1	1	1	1	1
Total.....	12	14	17	7	2	9	15	2	26
Total from all causes.....	270	341	140	17	237	233	28	498	

V. RESPIRATORY SYSTEM.

[illegible]

AN ALGEBRAIC APPROACH TO THE DIGESTIVE SYSTEM.

[illegible]

VII. GENTO-URINARY SYSTEM.

[illegible]

VIII. PUERPERAL DISEASES.

[illegible]

IX. DISEASES OF THE SKIN.

[illegible]

X. LOCOMOTOR SYSTEM.

XI. MALFORMATIONS, ETC.

XIV. ILL-DEFINED CAUSES.									
3	3	3	3	3	3	3	3	3	3
1. Dropsy	1	1	1	1	1	1	1	1	1
2. Tumors	3	3	3	3	3	3	3	3	3
3. Other ill-defined causes	12	9	16	4	2	1	1	1	1
4. Heart Failure	16	7	18	3	2	6	1	1	1
5. Tetanus	3	2	4	1	1	1	1	1	1
37	19	43	9	4	16	36	4	4	4
Total									
Total from all causes									
910	804	19	1410	282	41	1031	590	112	612
1733	134	130	128	132	135	127	135	132	140

CAUSES OF DEATHS BY COUNTIES IN 1905.—(Including municipalities of all classes.)

[illegible]

CAUSES OF DEATHS BY COUNTIES IN 1905—ELGIN—(Including municipalities of all classes.)

General Diseases.

[illegible]

ESSEX.—*Concluded.*

[illegible]

CAUSES OF DEATHS BY COUNTIES IN 1905.—FRONT-NAC.—(Including Municipalities of all classes.)

[illegible]

II. OTHER GENERAL DISEASES.									
1. Pyæmia and Septicæmia	1	3	3	1	...	1	24	3	4
2. Tuberculosis and Scrofula	34	30	58	6	...	37	24	3	64
3. Cancer	16	12	17	11	...	32	22	3	28
4. Rheumatism and Gout	...	3	3	...	...	2	1	...	3
5. Diabetes	5	1	5	1	...	2	4	...	6
6. Other General Diseases	1	...	...	1	...	1	...	...	1
Total	57	49	86	20	...	46	53	7	106
Local Diseases.									
III. NERVOUS SYSTEM.									
1. Encephalitis	1	2	3	...	...	3	1	...	3
2. Simple Meningitis	4	5	9	...	...	1	2	...	9
3. Epidemic Cerebro-spinal Meningitis	1	...	1	...	...	1	...	...	1
4. Congestion and Hemorrhage of Brain	7	6	5	8	...	9	3	...	13
5. Paralysis without specified cause	19	17	20	16	...	14	20	2	36
6. Insanity	1	2	3	...	...	3	...	...	3
7. Epilepsy	1	2	1	2	...	1	2	...	3
8. Convulsions (not puerperal)	8	6	14	...	...	14	...	...	14
9. Other Nervous Diseases	1	2	2	1	...	3	...	...	3
Total	42	43	58	17	...	41	36	5	85
IV. CIRCULATORY SYSTEM.									
1. Endocarditis	1	...	1	...	...	...	...	...	1
2. Organic Heart Diseases	11	21	18	12	...	13	19	...	32
3. Arteries, Atheroma, Aneurism, etc.	3	...	2	1	...	2	1	...	3
Total	14	22	18	15	...	15	21	...	36
V. RESPIRATORY SYSTEM.									
1. Acute Bronchitis	1	1	1	...	...	...	...	...	1
2. Chronic Bronchitis	1	1	2	...	...	1	1	...	2
3. Broncho-pneumonia	1	3	3	1	...	3	1	...	4
4. Pneumonia	20	17	32	3	...	14	3	...	37
5. Pleurisy	3	1	3	1	...	2	2	...	4
6. Congestion of the Lungs	1	1	1	1	...	1	1	...	1
7. Asthma and Emphysema	2	...	2	...	...	2	...	...	2
8. Other Diseases of Respiratory System	1	2	3	...	...	3	...	...	3
Total	27	28	45	8	...	30	22	3	55
VI. DIGESTIVE SYSTEM.									
1. Other Diseases of Stomach (cancer excepted)	3	3	3	3	...	1	5	...	6
2. Infantile Diarrhoea and Cholera Infantum	9	11	20	...	...	20	...	...	20
3. Diarrhoea and Enteritis (not Infantile)	2	...	1	...	...	1	...	...	1
4. Dysentery	1	...	1	...	...	1	...	...	1
5. Hemorrhoids	1	4	4	1	...	5	...	...	5
6. Hemorrhoids and Intestinal obstructions	3	2	4	1	...	1	4	...	6
7. Diseases of the Liver	1	...	1	...	...	1	...	...	1
8. Peritonitis (not Puerperal)	4	5	9	...	...	6	2	1	9
9. Ilac Abscess and Appendicitis	...	...	...	...	...	...	...	...	...
Total	23	26	43	6	...	31	17	1	49

General Diseases.

[illegible]

	1930	1934	1966	64	4	100	146	18	50	6	2	5	4	9	11	13	14	15	16	14	38	48	23	25	26	19	20	21	22	23	24	27	14	264
VI. DIGESTIVE SYSTEM																																		
1. Other Diseases of Stomach (cancer excepted)	5	4	1	9	1	1	9	1	8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
2. Inflammation and Enteritis (not infantile)	1	1	5	2	3	1	2	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
3. Hernia and Intestinal obstructions	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
4. Diseases of the Liver	3	2	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
5. Peritonitis (not peritonal)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
6. Peritonitis (not peritonal)	2	1	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
7. Hinc Abscess and Appendicitis	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
Total	12	14	23	8	14	11	1	9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
VII. GENITO-URINARY SYSTEM																																		
1. Acute Nephritis	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
2. Bright's Disease	2	6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
3. Other Diseases of Kidneys and Adnexa	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
4. Diseases of the Bladder	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Total	5	8	11	2	5	8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
VIII. PUERPERAL DISEASES																																		
1. Puerperal Albuminuria and Convulsions	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Total	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
IX. THE SKIN																																		
(No Cases in this Class)																																		
X. LOCOMOTOR SYSTEM																																		
1. Foot's Disease	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
Total	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
XI. MALFORMATIONS, ETC																																		
1. Still-Births	4	2	6	6																														

II. OTHER GENERAL DISEASES.

1. Pyrexia and Septicæmia	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
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Local Diseases.

III. NERVOUS SYSTEM

[illegible]

IV. CIRCULATOR SYSTEM.

[illegible]

Total
V. RESPIRATORY SYSTEM.

[illegible]VI. DISCUSSIVE SYNTHESIS.[illegible]

Number of column.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41			
VII. GENITO-URINARY SYSTEM.																																												
1. Acute Nephritis.....	2	2	...	1	3	...	1	2	
2. Bright's Disease.....	12	7	...	10	9	...	1	17	1	
3. Other Diseases of the Kidneys and Adnexa.....	5	1	...	3	3	
4. Diseases of the Bladder.....	2	2	
5. Diseases of the Male Genital Organs.....	2	1	
6. Other Diseases of the Female Genital Organs.....	3	2	1	
Total.....	23	13	...	17	19	...	4	31	1
VIII. PTERIAL DISEASES.																																												
1. Puerperal Albumin and Convulsions.....	...	1	...	1	
2. Other Accidents of Pregnancy, sudden death.....	...	1	...	1	
Total.....	2	2
IX. THE SKIN.																																												
(No Cases in this Class.)																																												
X. LOCOMOTOR SYSTEM.																																												
(No Cases in this Class.)																																												
XI. MALFORMATIONS, ETC.																																												
1. Still Births.....	15	16	1	22	...	...	32	...</																																			

CAUSES OF DEATHS BY COUNTIES IN 1905.—KENT.—(Including Municipalities of all Classes).

General Diseases	Sex.		Nativity.		Soc'l con.		Ages.			Months.																														
	Not stated.		Foreign.		Not stated.		Single.		Married.		Not stated.		Not stated.																											
	Male.	Female.	Canada.	Foreign.	Canada.	Foreign.	Single.	Married.	Not stated.	Single.	Married.	Not stated.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.															
Number of Column.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
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CAUSES OF DEATHS BY COUNTIES IN 1905.—LAMBTON.—(Including municipalities of all classes).

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CAUSES OF DEATHS BY COUNTIES IN 1905.—LANARK.—(Including municipalities of all classes.)

Sex. Nativity. Soc'l con. Ages. Months.

General Diseases.

Under 5.

Not stated. Married. Single. Not stated. Foreign. (Canada. Not stated. Female. Male.

Number of column. 0-1. 1-2. 3-4. 5-9. 10-14. 15-19. 20-24. 25-29. 30-34. 35-39. 40-44. 45-49. 50-59. 60-69. 70-79. 80 and over. Not given. January. February. March. April. May. June. July. August. September. October. November. December. Totals.

I. COMMUNICABLE (EPIDEMIC) DISEASES.

1. Typhoid Fever.
2. Scarlet Fever.
3. Whooping Cough.
4. Diphtheria and Croup.
5. Influenza.

Total

II. OTHER GENERAL DISEASES.

1. Pyæmia and Septicæmia.
2. Tuberculosis and Scrofula.
3. Cancer.
4. Rheumatism and Gout.
5. Diabetes.
6. Other General Diseases.

Total

Local Diseases.

III. DISEASES OF NERVOUS SYSTEM.

1. Encephalitis.
2. Simple Meningitis.
3. Epidemic Cerebro-spinal Meningitis.
4. Congestion and Hemorrhage of Brain.
5. Softening of the Brain.
6. Paralysis without specified cause.
7. Epilepsy.
8. Convulsions (not puerperal).
9. Other Nervous Diseases.

Total

IV. CIRCULATORY SYSTEM.

1. Endocarditis.
2. Organic Heart Disease.
3. Angina Pectoris.

Total

V. RESPIRATORY SYSTEM.

1. Acute Bronchitis.....
2. Chronic Bronchitis.....
3. Broncho-pneumonia.....
4. Pneumonia.....
5. Pleurisy.....
6. Asthma and Emphysema.....

Total

VI. DIGESTIVE SYSTEM.

1. Other Diseases of Stomach (cancer excepted).....
2. Infantile Diarrhea and Cholera Infantum.....
3. Diphtheria and Enteritis (not infantile).....
4. Hernia and Intestinal obstructions.....
5. Other Diseases of the Intestines.....
6. Diseases of the Liver.....
7. Peritonitis (not puerperal).....
8. Peritonitis (not puerperal).....
9. Dupe Abscess and Appendicitis.....

Total

VII. GENITO URINARY SYSTEM.

1. Bright's Disease.....
2. Other Diseases of Kidneys and Uterus.....
3. Diseases of the Bladder.....
4. Diseases of the male Genital Organs.....
5. Ovarian Cysts and other Ovarian Tumors.....

Total

VIII. PUERPERAL DISEASES.

1. Puerperal Albuminuria and Convulsions.....
2. Other Accidents of Pregnancy, sudden death.....

Total

IX. DISEASES OF THE SKIN.

(No cases in this Class.)

X. LOCOMOTOR SYSTEM.

(No cases in this Class.)

XI. MALFORMATIONS, ETC.

1. Still-Births.....
2. Congen. Deformity and Malformation.....
3. Senile Decay.....

Total

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LANARK.—Continued.

[illegible]

CAUSES OF DEATHS BY COUNTIES IN 1905.—LEEDS AND GRENVILLE.—(Including municipalities of all classes).

[illegible]

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	52
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XIV. ILL-DEFINED CAUSES.

[illegible]

CAUSES OF DEATHS BY COUNTIES IN 1905.—LENNOX AND ADDINGTON.—(Including municipalities of all classes.)

General Diseases.

Number of Column.		Totals.																																																																																	
Male.	Female.	Not stated.	Canada.	Foreign.	Not stated.	Single.	Married.	Not stated.	0, 1	2	3	4	5	6	7	8	9	Not stated.	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40																																		
																																										COMMUNICABLE (EPIDEMIC) DISEASES.																																									
																																										1. Typhoid Fever.....																																									
																																										2. Whooping Cough.....																																									
																																										3. Diphtheria and Croup.....																																									
																																										4. Influenza.....																																									
																																										Total.....																																									
																																										OTHER GENERAL DISEASES.																																									
																																										1. Malarial Fever.....																																									
																																										2. Tuberculosis and Scrofula.....																																									
																																										3. Cancer.....																																									
																																										4. Diabetes.....																																									
																																										5. Other General Diseases.....																																									
																																										Total.....																																									

Local Diseases.

	No.	%	Total
II. NERVOUS SYSTEM			
1. Simple Meningitis	1	1	1
2. Congestion and Hemorrhage of the Brain	11	10	11
3. Paralysis without specified cause	5	8	13
4. Convulsions (not epileptic)	2	1	3
5. Other Nervous Diseases	4	4	7
Total	19	14	33

5 R.G.

CAUSES OF DEATHS BY COUNTIES IN 1905.—MIDDLESEX.—(Including Municipalities of all Classes.)

General Diseases.																																																				
Sex.	Nativity.		Social Condition.	Under 5.	Ages.										Months.	Totals.																																				
	Not stated.	Canada.			Foreign.	Not stated.	Single.	Married.	Not stated.	0-1	1-2	3-4	5-9	10-14			15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-59	60-69	70-79	80 and over.																									
Male.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	December	November	October	September	August	July	June	May	April	March	February	January
Number of Column.																																						41														
														I. COMMUNICABLE (EPIDEMIC) DISEASES.																																						
														1. Typhoid Fever.....																								17														
														2. Measles.....																								4														
														3. Scarlet Fever.....																								2														
														4. Whooping Cough.....																								1														
														5. Diphtheria and Croup.....																								15														
														6. Influenza.....																								15														
Total.....																																						48														
														II. OTHER GENERAL DISEASES.																																						
														1. Pyæmia and Septicæmia.....																								10														
														2. Tuberculosis and Scrophula.....																								126														
														3. Cancer.....																								56														
														4. Rheumatism and Gout.....																								2														
														5. Diabetes.....																								9														
														6. Other General Diseases.....																								13														
														7. Alcoholism, Acute and Chronic.....																								2														
Total.....																																						218														
														III. DISEASES OF NERVOUS SYSTEM.																																						
														Local Diseases.																																						
														1. Encephalitis.....																								1														
														2. Simple Meningitis.....																								20														
														3. Epidemic Cerebro-spinal Meningitis.....																								46														
														4. Congestion and Hemorrhage of the Brain.....																								51														
														5. Softening of the Brain.....																								13														
														6. Paralysis without specified cause.....																								21														
														7. Insanity.....																								11														
														8. Epilepsy.....																								21														
														9. Convulsions (not puerperal).....																								21														
														10. Other Nervous Diseases.....																								174														
Total.....																																						174														

[illegible]

VII. GENITO-URINARY SYSTEM.	
1. Acute Nephritis.....	
2. Bright's Disease.....	
3. Other Diseases of Kidneys and Adnexa.....	
4. Diseases of the Bladder.....	
Total.....	
VIII. PUERPERAL DISEASES.	
1. Puerperal Albuminuria and Convulsions.....	
2. Other accidents of Pregnancy, sudden death.....	
Total.....	

[illegible][illegible][illegible][illegible][illegible]

Total from all causes.....	73	65	2	28	55	47	42	56	42	61	35	16	7	6	24	1	21	47	35	37	25	10	16	29	23	26	10	11	43	51	47	39	37	40	83	51	76	53	53	63	640
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CAUSES OF DEATHS BY COUNTIES IN 1905.—NORFOLK.—(Including municipalities of all classes.)

[illegible]

NORFOLK.—*Concluded.*

[illegible]

CAUSES OF DEATHS BY COUNTIES IN 1905.—NORTHUMBERLAND AND DURHAM.—(Including municipalities of all classes.)

[illegible]

III. OTHER GENERAL DISEASES.

II. OTHER GENERAL DISEASES.									
1. Pyæmia and Septicæmia	2	3	2	3	1	1	1	1	1
2. Tuberculosis and Scrophula	25	31	40	1	27	1	1	1	1
3. Rheumatism and Gout	2	1	18	4	3	1	1	1	1
4. Rheumatism and Gout	3	7	4	1	1	1	1	1	1
5. Diabetes	3	7	4	1	1	1	1	1	1
6. Other General Diseases	3	7	4	1	1	1	1	1	1
Total	44	65	85	22	58	66	5	1	1

Local Diseases.

III. NEVOI'S SYSTEM.

[illegible]

IV. CIRCULATORY SYSTEM.

A. CIRCULATORY SYSTEM									
1. Endocarditis	1	...	1	...	1	...	1	...	1
2. Organic Heart Diseases	31	18	27	22	8	3	9	1	1
3. Angina Pectoris	2	...	2	...	2	...	2	...	2
4. Arteries, Atherosclerosis, etc.	2	...	1	...	1	...	2	...	2
Total	35	19	30	23	1	8	43	3	34

V. RESPIRATORY SYSTEM.

RESPIRATORY SYSTEM.									
1. Acute Bronchitis.....	4	1	6	1	5	4	3	1	2
2. Chronic Bronchitis.....	23	5	6	5	6	5	3	1	2
3. Bronchio-Pneumonia.....	3	1	1	1	1	1	1	1	1
4. Pneumonia.....	16	9	11	2	9	24	1	1	12
5. Pleurisy.....	20	2	3	2	2	2	1	1	36
6. Congestion of the Lungs (incl. pul. apoplexy).....	2	1	1	1	1	1	1	1	2
7. Asthma and Emphysema.....	4	2	1	1	1	1	1	1	2
8. Other Diseases of Respiratory System.....	2	1	1	1	1	1	1	1	1

VI. DISCUSSION AND CONCLUSION

TABLE 5. Cause of Death.	
Cause of Death	No. of Deaths
1. Unknown cause (cancer suspected)	3
2. Unknown cause (cancer confirmed)	13
3. Infection (diphtheria, scarlet fever, etc.)	6
4. Marfan and Enteritis (not infantile)	4
5. Marfan and Intestinal obstructions	1
6. Other diseases of the Intestines	2
7. Diseases of the Liver	1
8. Peritonitis (not puerperal)	1
9. Blac Abscess and Appendicitis	1
Total	40

Total from all causes	409	318	3	504	218	3	316	400	100	144	13	5	14	7	13	20	24	22	23	25	51	82	110	61	65	90	72	43	56	54	68	62	58	725
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XIV. ILL-DEFINED CAUSES.

XIV. ILL-DEFINED CAUSES.									
1. Dropsy.....	3	1	3	1	4	1	1	1	1
2. Tumors.....	1	1	1	1	1	1	1	1	4
3. Other ill-defined causes.....	2	5	4	2	1	1	1	1	1
4. Heart Failure.....	1	6	7	1	6	1	1	1	7
Total.....	7	12	15	3	1	3	2	2	19
Total from all causes.....	165	133	1	222	63	14	180	111	269

CAUSES OF DEATHS BY COUNTIES IN 1905.—PEEL.—(Including municipalities of all classes.)

General Diseases.

[illegible]

1. COMMUNICABLE (EPIDEMIC) DISEASES.

1. COMMUNICABLE (EPIDEMIC) DISEASES.									
3	1	4	3	1	...	...	...	...	1
1	1	1	1	1	...	...	...	...	1
2	1	1	1	1	...	...	...	...	1
3	2	6	6	1	1	1	1	1	1
4	1	4	3	2	3	1	2	1	2
5	...	...	...	...	...	...	...	...	...
14	3	16	14	3	5	1	2	1	2
17	...	...	...	...	...	...	...	...	...
Total									

II. OTHER GENERAL DISEASES.

II. OTHER GENERAL DISEASES.									
1. Pæmic and Septicæmia.....	2	1	2	1	2	1	1	1	3
2. Tuberculous and scrofula.....	17	12	21	5	14	15	1	2	29
3. Cancer.....	7	4	3	1	3	8	1	1	11
4. Rheumatism and Gout.....	1	3	1	1	1	3	1	1	4
5. Diabetes.....	.....	2	2	.....	2	2	.....	.....	4
6 Other General Diseases.....	1	2	2	1	1	2	1	1	3
Total.....	28	24	40	12	20	32	.....	.....	52

PEEL.—Continued.

Number of Column.		1	2	3	1	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41			
IX. THE SKIN (No cases in this class.)																																													
X. LOCOMOTOR SYSTEM.																																													
1. Diseases of Bones and Joints.		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Total		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
XI. MALFORMATIONS, ETC.																																													
1. Still-Births.		1	1	2	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	
2. Congen. Debil. and Malformations		16	9	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
3. Other Diseases of Infancy		2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
4. Senile decay.		29	24	16	16	37	6	17	6	17	6	17	6	17	6	17	6	17	6	17	6	17	6	17	6	17	6	17	6	17	6	17	6	17	6	17	6	17	6	17	6	17	6	17	
Total		8	34	2	17	37	37	37	37	47	28	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
XII. SUICIDE.																																													
1. Firearms.		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Total		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
XIII. ACCIDENTS.																																													
1. Fractures and Dislocations		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
2. Drowning		1	1	2	2	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
3. Railways		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
4. Burns and Scalds		3	1	2	2	2	1	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
5. Other accidents		3	1	1	2	2	1	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Total		6	4	7	7	3	3	7	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	
XIV. ILL DEFINED CAUSES.																																													
1. Dropsy		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
2. Tumors		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
3. Other Ill Defined Causes		1	2	3	3	1	1	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
4. Heart Failure		1	1	1	1	2	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Total		4	1	5	5	3	3	5	2	1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Total from all causes.		170	134	2	197	107	2	129	175	2	49	7	2	3	4	9	8	4	8	16	7	11	7	28	46	53	46	2	23	33	35	24	28	14	26	22	26	23	28	28	306				

Total

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VII. GENITO-URINARY SYSTEM.									
1. Acute Nephritis.....	1	1	1	1	1	1	1	1	1
2. Bright's Disease.....	10	5	11	3	1	7	8	1	15
3. Other Diseases of the Kidneys and Adnexa.....	5	1	4	1	1	4	1	1	6
4. Diseases of the Bladder.....	1	1	1	1	1	1	1	1	1
Total	17	6	16	5	2	8	11	1	23
VIII. PULPERAL DISEASES. (No Cases in this Class.)									
IX. THE SKIN.									
1. Other Diseases of the Skin (cancer excepted).....	1	1	1	1	1	1	1	1	1
Total	1	1	1	1	1	1	1	1	1
X. LOCOMOTOR SYSTEM. (No Cases in this Class.)									
XI. MALFORMATIONS, ETC.									
1. Still-Births.....	14	14	45	45	45	45	45	45	45
2. Congen. Debil. and Malformations.....	37	18	55	55	55	55	55	55	55
3. Other diseases of Infancy.....	2	1	3	3	3	3	3	3	3
4. Senile Decay.....	28	25	12	10	1	2	50	1	53
Total	81	58	115	40	1	105	50	1	156
XII. SUICIDE.									
1. Poison.....	2	2	2	2	2	2	2	2	2
2. Strangulation.....	1	1	1	1	1	1	1	1	1
Total	3	3	3	3	3	3	3	3	3
XIII. ACCIDENTS.									
1. Fractures and Dislocations.....	1	1	2	2	2	2	2	2	2
2. Gunshot.....	1	1	1	1	1	1	1	1	1
3. Drowning.....	3	3	3	3	3	3	3	3	3
4. Railways.....	2	1	3	3	3	3	3	3	3
5. Burns and Scalds.....	1	1	1	1	1	1	1	1	1
6. Other accidents.....	8	2	6	3	1	5	5	1	10
Total	17	1	14	5	2	12	8	1	21
XIV. ILL-DEFINED CAUSES.									
1. Dropsy.....	4	1	1	3	1	1	3	1	5
2. Tumors.....	1	2	2	1	3	1	1	1	3
3. Other Ill-defined Causes.....	3	3	6	4	2	4	2	1	6
4. Heart Failure.....	1	1	4	1	1	1	1	1	3
Total	11	7	13	4	4	7	10	1	18
Total from all causes.....									
	271	201	356	123	10	241	231	17	489

7 R. G.

Number of Column.

[illegible]

CAUSES OF DEATH BY COUNTIES IN 1905.—(Including Municipalities of all Classes.)

(General Diseases.

[illegible]

RENFREW.—Concluded.

Number of Column.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	
VIII. PUERPERAL DISEASES.																																										
1. Puerperal Septicæmia	2			2				2													1																					
2. Puerperal Albuminuria and Convulsions	1			1				1													1																					
3. Other accidents of Pregnancy, sudden death.	8			3				3													1																					
Total	6			6				6													1																					
IX. THE SKIN.																																										
(No cases in this class.)																																										
X. LOCOMOTOR SYSTEM.																																										
1. Amputation (for unspecified Disease)	1					1		1													1																					
Total	1					1		1													1																					
XI. MALFORMATIONS, ETC.																																										
1. Still-Births	24	8	2	31			31			31																																
2. Congenital Deformity and Malformations	48	85		85			85			79	4																															
3. Other Diseases of Infancy	2	1					6			5																																
4. Sudden Death	42	58		31	62	2	9	81																																		
Total	116	100	2	154	62	2	132	81	5	113	1	5																														
XII. STICKE.																																										
(No cases in this class.)																																										
XIII. ACCIDENT.																																										
1. Fractures and Dislocations	2			2				2																																		
2. Gunshot	1						1																																			
3. Lightning	1							1																																		
4. Drowning	9	1		10			9	1																																		
5. Electric Cuts	1						1																																			
6. Railways	4			3			3	1																																		
7. Burns and Scalds	2			2			2																																			
8. Other Accidents	11	1		9			9	3																																		
Total	25	5		25	5		25	5																																		
XIV. ILL-DEFINED CAUSES.																																										
1. Dropsy	4	1		4			1	6	1																																	
2. Tumors	2			2				1																																		
3. Other Ill-Defined Causes	5	11		12	4		12	4																																		
4. Heart Failure	6	8		10	4		3	11																																		
Total	17	23		25	12		16	22	2																																	
Total from all causes	379	345	2	573	141	12	436	275	15	193	25	27	13	11	26	26	29	22	18	23	19	15	31	45	74	77	15	52	59	52	46	87	93	63	62	43	56	726				

VIII. PUERPERAL DISEASES.									
1. Puerperal Albuminuria and Convulsions	5	5	2	1	1	2	2	1	5
2. Other Accidents of Pregnancy, sudden death.	4	4		2	1		2	1	4
Total	9	9		2	1		4	1	9
IX. THE SKIN.									
1. Erysipelas.	2	1			1			1	2
2. Skin and Adnexa (cancer excepted).	2	1			1			1	2
Total									
X. LOCOMOTOR SYSTEM.									
(No deaths in this class.)									
XI. MALFORMATIONS, ETC.									
1. Still-Births	34	32	3	70					70
2. Congenital Deblity and Malformations	76	62	2	140					138
3. Other Diseases of Infancy	68	79		34	110	3	13	133	1
1. Senile Decay									
Total	182	175	5	249	110	3	228	133	1
XII. SUICIDE.									
1. Other Methods	1			1					1
Total	1			1					1
XIII. ACCIDENTS.									
1. Fractures and Dislocations	6	1	3	3					
2. Gunshot	1								
3. Drowning	8	2	5	5					
4. Railway	1		6	2					
5. Burns and Scalds	1		2						
6. Homicide	2								
7. Other Accidents	14	3	12	5					
Total	36	10	31	15					
XIV. ILL-DEFINED CAUSES.									
1. Dropsy	3	3	4	2					
2. Tumors	1	3	3	1					
3. Other Ill-defined Causes	21	9	26	3					
4. Heart Failure	7	8	12	3					
Total	32	23	45	9					
Total from all causes	586	527	806	299	13	584	519	15	284

Total from all causes

586 527 806 299 13 584 519 15 284 21 8 8 5 21 25 40 39 48 24 35 33 78 114 144 125 7 100 103 101 87 92 96 1,116

STORMONT, DUNDAS AND GLENGARRY. — *Concluded.*

Number of Column.		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	
XII. SUICIDE.																																											
1. Poison.		1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Total		1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
XIII. ACCIDENTS.																																											
1. Fractures and Dislocations.		3	1	2	5	1	3	1	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
2. Drowning.		3	2	1	5	1	4	1	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
3. Railways.		1	2	1	3	1	3	2	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
4. Burns and Scalds.		1	2	1	3	1	3	2	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			
5. Other Accidents.		3	1	2	4	1	3	2	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			
Total		16	5	10	16	1	1	12	8	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2		
XIV. ILL-DEFINED CAUSES.																																											
1. Dropsy.		2	1	3	4	2	1	5	1	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
2. Tumors.		6	12	13	3	2	6	11	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			
3. Other Ill-defined Causes.		4	6	12	1	1																																					

III. OTHER GENERAL DISEASES.

11. OTHER GENERAL DISEASES.										
1. Pyemia and Septicemia	1	1	1	1	1	1	1	1	1	2
2. Tuberculosis and Scrofula	16	10	22	3	19	5	2	1	1	26
3. Cancer	2	2	4	1	1	1	1	1	1	1
1. Alcoholism, Acute and Chronic	1	1	1	1	1	1	1	1	1	1
Total	20	13	24	7	20	11	2	4	3	33

Local Diseases.

III. NERVOUS SYSTEM.

	1	2	3	4	5	6	7	8	9	10	11	12	Total
1. Simple Meningitis.....	4	3	1	3	2	1	1	1	1	1	1	1	4
2. Congestion and Hemorrhage of the Brain.....	3	1	2	2	1	1	1	1	1	1	1	1	4
3. Softening of the Brain.....	1	1	1	1	1	1	1	1	1	1	1	1	1
4. Convulsions (not puerperal).....	4	4	1	6	2	1	1	1	1	1	1	1	3
5. Other Nervous Diseases.....	1	1	1	1	1	1	1	1	1	1	1	1	1
Total	12	6	12	3	11	7	5	1	1	1	2	1	1

IV. DISEASES OF CIRCULATORY SYSTEM.

[illegible]

V. RESPIRATORY SYSTEM.

[illegible]

VI. DIGESTIVE SYSTEM.

	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	Total
1. Other Diseases of Stomach (cancer excepted)	21	13	1	1	2	1	2	1	2	1	2
2. Injurious Bile and Cholem Intestum	17	13	28	2	30	1	1	23	7	1	30
3. Diarrhoea and Enteritis (not infantile)	1	1	1	1	1	1	1	1	1	1	1
4. Dysentery	1	1	1	1	1	1	1	1	1	1	1
5. Hernia and Intestinal obstructions	1	1	1	1	1	1	1	1	1	1	1
6. Other Diseases of the Intestines	1	1	1	1	1	1	1	1	1	1	1
7. Diseases of the Liver	1	1	1	1	1	1	1	1	1	1	1
8. Peritonitis (not puerperal)	1	2	1	1	1	1	1	1	1	1	3
9. Iliac Abscess and Appendicitis	1	1	2	1	1	1	1	1	1	1	1
Total	21	17	36	3	37	4	1	24	8	1	41

VII. GENITO-URINARY SYSTEM.

1. Bright's Disease	4	2	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
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General Diseases.

General Diseases.	Sex.		Nativity.		Social Condition.		Ages.										Months.																																					
	Sex.		Nativity.		Social Condition.		Ages.										Months.																																					
	Male.	Female.	Not stated.	Canada.	Foreign.	Not stated.	Single.	Married.	Not stated.	Under 5.	5-9.	10-14.	15-19.	20-24.	25-29.	30-34.	35-39.	40-44.	45-49.	50-59.	60-69.	70-79.	80 and over.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Totals.																		
Number of Column.	1	2	3	4	5	6	7	8	9	0.1	1.	2.	3.	4.	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41								
I. COMMUNICABLE (EPIDEMIC) DISEASES.																																																						
1. Typhoid Fever.....	2	6		6	2		6	2			1	4	1	1						1	1																																	
2. Smallpox.....	1			1																																																		
3. Scarlet Fever.....	1			1							1																																											
4. Diphtheria and Croup.....	1			5			5				1	1																																										
5. Influenza.....	1	2		1	2		1	2																																														
Total.....	9	9		14	4		14	4			1	1	2	1						5	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	3																		
II. OTHER GENERAL DISEASES.																																																						
1. Pyæmia and Septicæmia.....	5			5			2	3			2	5	5	1																																								
2. Tuberculosis and Scrofula.....	13	18		27	4		13	16	2			2	5	3	5	3	3	2	2	1	1																																	
3. Cancer.....	6	4		6	3	1	3	7				1	1	1	1	3		3	1																																			
4. Rheumatism and Gout.....	2	1		2			1	1				1	2	2	1	2		1																																				
5. Diabetes.....	5	4		9			3	6				1	2	1	2		1																																					
6. Other General Diseases.....	2	5					1	6				1	1	2	1	1		1																																				
Total.....	31	33																																																				

CAUSES OF DEATHS BY COUNTIES IN 1905.—WATERLOO. (Including municipalities of all classes.)[illegible]

VII. GENITO-URINARY SYSTEM.																				
1. Acute Nephritis.....	1	2	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	3
2. Bright's Disease.....	5	8	8	5	2	2	2	2	2	2	12	1	3	1	1	2	1	1	1	13
3. Other Diseases of the Kidneys and Adnexa.....	2	1	1	2	1	1	1	1	1	1	3	1	1	1	1	1	1	1	1	7
4. Vesical Calculi.....	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2
5. Diseases of the Bladder.....	4	3	1	6	1	1	1	1	1	1	6	1	1	1	1	1	1	1	1	7
6. Diseases of the Male Genital Organs.....	2	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	2
7. Other Diseases of the Female Genital Organs.....	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Total	15	16	15	14	2	1	28	2	2	2	1	5	8	6	1	2	1	3	2	31
VIII. PUERPERAL DISEASES, AND CONVULSIONS.																				
1. Puerperal Albuminuria and Convulsions.....	2	4	2	2	2	2	2	2	2	2	4	1	1	1	1	1	1	1	1	2
2. Other Accidents of Pregnancy, sudden death.....	4	4	4	4	4	4	4	4	4	4	4	1	1	1	1	1	1	1	1	4
Total	6	6	6	6	6	6	6	6	6	6	6	1	1	1	1	1	1	1	1	6
IX. THE SKIN.																				
(No Cases in this Class.)																				
X. LOCOMOTOR SYSTEM.																				
(No Cases in this Class.)																				
XI. MALFORMATIONS, ETC.																				
1. Still-births.....	19	18	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
2. Congenital Deformity and Malformations.....	43	27	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70
3. Other Diseases of Infancy.....	2	2	16	57	3	67	3	2	2	2	3	67	3	2	2	2	2	2	2	73
4. Senile Decay.....	44	29	125	57	112	67	3	109	109	109	109	109	109	109	109	109	109	109	109	182
Total	108	74	125	57	112	67	3	109	109	109	109	109	109	109	109	109	109	109	109	182
XII. SUICIDE.																				
1. Poison.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2. Strangulation.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3
3. Other methods.....	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	6
Total	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	10
XIII. ACCIDENTS.																				
1. Fractures and Dislocations.....	1	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
2. Gunshot.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
3. Drowning.....	3	1	3	1	3	1	3	1	3	1	3	1	3	1	3	1	3	1	3	3
4. Railways.....	3	2	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1
5. Burns and Scalds.....	1	1	4	3	1	4	3	1	4	3	1	4	3	1	4	3	1	4	3	8
6. Other Accidents.....	7	1	4	3	1	4	3	1	4	3	1	4	3	1	4	3	1	4	3	20
Total	16	4	13	6	11	8	1	1	1	1	1	1	1	1	1	1	1	1	1	20
XIV. ILL-DEFINED CAUSES.																				
1. Dropsy.....	3	8	4	6	1	11	1	1	1	1	1	1	1	1	1	1	1	1	1	11
2. Other Ill-Defined Causes.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3
3. Heart Failure.....	3	3	1	2	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	15
Total	7	12	6	9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	15
Total from all causes	339	296	399	202	34	278	305	52	165	10	4	6	5	16	19	20	21	23	20	635

CAUSES OF DEATHS BY COUNTIES IN 1905.—WELLAND.—(Including municipalities of all classes.)

General Diseases.	Sex.	Nativity.		Social con.		Ages.												Months.												Totals.													
		Male.	Female.	Not stated.	Canada.	Foreign.	Not stated.	Single.	Married.	Not stated.	Under 5.																																
											0-1	1-2	2-3	3-4	4-5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-59	60-69	70-79	80 and over	January.		February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.		
Number of Column.		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	
I. COMMUNICABLE (EPIDEMIC) DISEASES.																																											
1. Typhoid Fever.....	2	1			3				3																																		
2. Measles.....	1				1				1																																		
3. Scarlet Fever.....	1				1				1																																		
4. Whooping Cough.....	1	3			4				4																																		
5. Diphtheria and Croup.....	3				3				3																																		
6. Influenza.....	1	2			3				3																																		
Total.....	9	6		14	1	1		11	4		4	2	1	2																													
II. OTHER GENERAL DISEASES.																																											
1. Pyæmia and Septicæmia.....	2								2																																		
2. Tuberculosis and Scrofula.....	11	22		27	1	1		16	15																																		
3. Cancer.....	3	8		6	5				2																																		
4. Rheumatism and Gout.....	1								1																																		
5. Diabetes.....	4			3	1				1																																		
6. Other General Diseases.....	1	2		3					3																																		
7. Alcoholism, Acute and Chronic.....	1								1																																		
Total.....	20	35		40	15		19	31	5		1																																
III. NERVOUS SYSTEM.																																											
1. Encephalitis.....	4			3	1			3	1																																		
2. Simple Meningitis.....	1	2		3				1	2																																		
3. Epidemic Cerebro-spinal Meningitis.....	1	1		1	1			1	1																																		
4. Congestion and Hemorrhage of the Brain.....	6	3		8	1			1	3																																		
5. Softening of the Brain.....	2	2		3	1																																						
6. Paralysis without specified cause.....	10	14		20	4			4	16																																		
7. Insanity.....	1			1																																							
8. Epilepsy.....	2	1		2				2																																			
9. Convulsions (not puerperal).....	3	1		1				1																																			
10. Other Nervous Diseases.....	1	1		2				1	1																																		
Total.....	31	24		42	9	4	13	33	9		5	1	1	2	2	1	1	2	2	1	2	2	1	3	6	9	14	3		8	3	3	9	4	3	2	5	3	3	5	7		

WENTWORTH. *Concluded.*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41			
IV. CIRCULATORY SYSTEM.																																												
1. Endocarditis.....	4	1	3	2	2	1	1	1	1	
2. Organic Heart Diseases.....	50	37	43	42	1	16	69	2	
3. Angina Pectoris.....	4	1	2	3	
4. Diseases of the Arteries, Atheroma, etc.....	2	1	1	2	2	1	
Total.....	56	43	47	51	1	19	77	3	
V. RESPIRATORY SYSTEM.																																												
1. Acute Bronchitis.....	14	4	16	2	14	4
2. Chronic Bronchitis.....	6	6	3	9	2	8
3. Broncho-pneumonia.....	6	12	15	3	12	6
4. Pneumonia.....	50	33	49	33	1	28	52	3
5. Pleurisy.....	3	2	4	1	3
6. Congestion of the Lungs (incl. pulm. apoplexy)	4	4	1	1	2	1	
7. Asthma and Emphysema.....	4	3	4	2	1	2	5	
8. Other Diseases of the Respiratory System.....	2	2	2	
Total.....	89	60	....	97	50	2	61	79	6	....	....																															

IX. DISEASES OF THE SKIN.

1. Erysipelas	2	3	4	1	1	4	.....	1	1	1	1	1	1	2	.....	1	.....	1	.....	5
Total	2	3	4	1	1	4	.....	1	1	1	1	1	1	2	.....	1	.....	1	.....	5

X. LOCOMOTOR SYSTEM.

1. Diseases of Bones and Joints.....	2	1	.....	1	2	.....	1	2	.....	1	1	1	1	1	.....	1	.....	1	.....	3
Total	2	1	.....	1	2	.....	1	2	.....	1	1	1	1	1	.....	1	.....	1	.....	3

XI. MALFORMATIONS, ETC.

57	33	11	101	.....	101	.....	101	.....	101	.....	12	7	9	7	3	7	10	10	8	11	8	101
70	50	120	120	119	1	119	1	13	8	10	4	6	9	16	9	19	12	6	8	120		
1	.....	1	.....	1	.....	1	.....	1	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
50	45	25	66	4	8	81	6	3	20	64	1	11	9	8	6	3	6	8	8	6	7	9	95	
178	128	11	217	66	4	280	81	6	221	1	3	20	62	1	39	24	27	19	16	18	31	27	26	27	317

XII. SUICIDE.

1. Poison	1	.....	1	.....	1	.....	1	.....	1	.....	1	.....	1	.....	1	.....	1	.....	1	.....	1	.....	1	.....	1	.....	1	
2. Strangulation	2	1	.....	3	.....	3	.....	2	.....	2	.....	1	.....	1	.....	1	.....	1	.....	1	.....	1	.....	1	.....	1	.....	3
3. Other methods	1	1	.....	1	.....	2	.....	1	.....	1	.....	1	.....	1	.....	1	.....	1	.....	1	.....	1	.....	1	.....	1	.....	2
Total	3	3	.....	4	1	1	5	.....	1	1	1	2	.....	1	3	.....	1	1	1	1	1	1	1	1	1	1	6	

XIII. ACCIDENTS.

1. Fractures and Dislocations.....	1	4	.....	3	2	.....	2	3	.....	2	3	.....	1	1	1	1	1	1	1	1	1	1	1	1	1	5
2. Gunshot	1	1	.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	15
3. Drowning	4	1	.....	2	3	.....	2	2	1	.....	2	.....	1	.....	1	.....	1	.....	1	.....	1	.....	1	.....	1	1
4. Electric Cuts	1	1	.....	2	.....	1	.....	1	.....	1	.....	1	.....	1	.....	1	.....	1	.....	1	.....	1	.....	1	.....	1
5. Railways	4	1	.....	3	1	.....	3	1	.....	3	1	.....	1	.....	1	.....	1	.....	1	.....	1	.....	1	.....	1	1
6. Burns and Scalds	1	2	.....	4	2	.....	3	1	.....	1	1	.....	1	1	1	1	1	1	1	1	1	1	1	1	1	6
7. Homicide	3	3	.....	1	.....	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3
8. Other accidents	28	8	.....	24	9	3	16	18	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	36
Total	40	28	.....	37	19	7	26	31	6	2	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	63

XIV. ILL-DEFINED CAUSES.

1. Dropsy	1	3	.....	1	3	.....	1	3	.....	1	3	.....	1	3	.....	1	3	.....	1	3	.....	1	3	.....	1	4
2. Tumors	2	3	.....	3	3	1	1	6	.....	1	1	2	.....	1	1	2	.....	1	1	2	.....	1	1	2	.....	1
3. Other Ill-defined Causes	3	4	.....	6	.....	1	4	3	.....	1	1	3	.....	1	1	3	.....	1	1	3	.....	1	1	3	.....	1
4. Heart Failure	5	5	.....	2	7	1	1	8	1	.....	1	1	.....	1	1	.....	1	1	.....	1	1	.....	1	1	.....	10
Total	11	17	12	13	3	7	26	1	1	1	2	1	1	2	1	1	2	1	1	2	1	1	2	28

Total from all causes

.....	711	596	11	874	417	27	643	630	45	334	42	21	8	10	31	22	30	42	44	50	37	36	44	110	138	177	131	16	107	106	130	113	94	102	122	101	123	99	101	120	1,318
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IV. CIRCULATORY SYSTEM.																
1. Pericarditis.....	5	1	3	3	1	1	1	1	2	1	1	1	6
2. Endocarditis.....	7	15	12	10	2	2	5	1	2	2	1	1	1	2	33
3. Organic Heart Diseases.....	159	176	172	154	9	74	244	17	1	2	4	14	6	10	13	30
4. Angina Pectoris.....	14	7	9	11	1	.....	20	.....	1	1	1	1	1	1	1	21
5. Diseases of Arteries, Aneurism, etc.	21	10	18	3	1	28	2	.....	.....	5	14	7	2	4	2	31
Total	206	209	.....	196	13	87	308	20	.....	2	2	4	17	8	16	415
V. RESPIRATORY SYSTEM.																
1. Acute Bronchitis.....	40	30	19	20	1	18	21	1	34	9	3	2	.....	1	8	70
2. Chronic Bronchitis.....	7	15	11	10	1	2	20	1	.....	.....	.....	.....	.....	.....	.....	27
3. Broncho-pneumonia.....	42	45	69	16	2	67	19	1	40	11	7	1	1	1	1	85
4. Pneumonia.....	157	123	184	93	3	122	149	9	32	12	9	1	5	7	10	280
5. Pleurisy.....	11	4	9	6	.....	7	8	.....	1	1	2	1	2	1	1	15
6. Congestion of the Lungs (inc. pul. apoplexy).....	9	13	13	6	3	8	12	.....	6	1	.....	1	1	1	1	22
7. Asthma and Emphysema.....	3	1	3	1	.....	1	3	.....	.....	.....	.....	.....	.....	.....	.....	4
8. Other Diseases of the Respiratory System.....	5	5	5	5	.....	3	6	1	.....	1	1	1	1	1	1	10
Total	274	236	341	159	10	258	238	14	114	33	19	5	4	7	10	510
VI. DIGESTIVE SYSTEM.																
1. Ulcer of the Stomach.....	3	3	4	1	1	3	3	.....	.....	1	2	1	.....	1	1	6
2. Other Diseases of Stomach (cancer excepted).....	15	15	13	16	1	9	19	2	.....	1	3	2	8	3	5	30
3. Infant. Diarr. (cholera infant.).....	114	132	276	.....	.....	276	.....	.....	254	19	3	1	.....	2	1	276
4. Diarrhoea and Enteritis (not infantile).....	12	14	12	13	1	6	18	2	.....	1	1	2	2	4	8	26
5. Dysentery.....	2	2	2	2	.....	2	2	.....	.....	1	1	1	1	1	1	4
6. Hemorrhoids.....	10	9	6	13	.....	18	1	.....	.....	1	1	2	3	2	1	19
7. Other Diseases of the Intestines.....	5	5	3	7	.....	2	8	.....	.....	1	1	1	1	1	1	10
8. Diseases of the Liver.....	20	7	16	9	2	4	22	1	.....	1	1	3	4	8	2	22
9. Peritonitis (not puerperal).....	27	31	41	17	.....	28	27	3	3	1	1	2	6	3	9	58
10. Iliac abscess (Typhlitis, perityphlitis, append.).....	20	10	23	7	.....	21	8	1	.....	1	3	7	4	5	1	30
Total	258	228	397	84	5	351	125	10	257	20	3	3	5	7	13	486
VII. GENITO-URINARY SYSTEM.																
1. Acute Nephritis.....	4	1	3	2	.....	.....	.....	.....	.....	1	2	2	.....	3	1	5
2. Bright's Disease.....	103	75	68	103	7	28	140	10	1	1	1	3	9	4	10	178
3. Other Diseases of the Kidneys and Adnexa.....	12	2	5	7	1	3	9	1	.....	1	1	1	1	1	1	13
4. Diseases of the Bladder.....	8	.....	2	6	.....	8	.....	.....	.....	1	1	2	1	1	1	14
5. Diseases of the male Genital Organs.....	1	.....	2	1	.....	2	.....	.....	.....	1	1	1	1	1	1	8
6. Metritis.....	2	2	2	2	.....	2	.....	.....	.....	1	1	1	1	1	1	2
7. Other Diseases of the Uterus.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total	139	82	82	130	9	36	172	13	.....	1	1	1	1	9	5	221
VIII. PUERPERAL DISEASES.																
1. Puerperal Septicæmia.....	2	1	1	.....	.....	2	.....	.....	.....	2	2	1	.....	1	1	2
2. Puerperal Albuminuria and Convul.	3	3	3	.....	.....	3	.....	.....	.....	2	1	.....	.....	1	.....	3
3. Other accidents of Pregnancy, sudden death.....	15	12	3	.....	.....	15	.....	.....	.....	1	1	3	2	3	3	15
Total	20	13	7	.....	.....	20	.....	.....	.....	3	2	4	2	3	4	20
IX. THE SKIN.																
1. Erysipelas.....	9	2	3	8	.....	3	7	1	.....	1	1	2	3	1	1	11
2. Other Diseases of the Skin and its Adnexa (Cancer excepted).....	1	.....	1	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	1	.....	1
Total	10	2	3	9	.....	3	7	2	.....	2	3	4	1	1	1	12

CAUSES OF DEATHS BY CITIES IN 1905.—HAMILTON.

General Diseases.

[illegible]

L. COMMUNICABLE (RELIGIOUS), DISPARATES.

[illegible]

H. GIFFRÉ, G. NERVAL, D. F. G. F.

1	Pyemia and Septicemia	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	
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Local Diseases.

III. ANALYSIS OF NEW VOLTAGE SYSTEM.

1. Simple Meninges.....	16	11	24	3	26	1	11	4	1	1	31	2	1	1
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IV. CIRCULATORY SYSTEM.

[illegible]

V. RESPIRATORY SYSTEM.

[illegible]

VI. HOSTIVE SYSTEM.

[illegible]

VII. GENTO-PRINARY SYSTEM.

[illegible]

VIII. PURPURA DELEZIANI.

1. Puerperal Septicæmia.....	1	1	1	1
2. Puerperal Albuminuria and Convulsions.....	1	1	1	1
3. Other Accidents of Pregnancy, sudden death.....	4	4	1	4
Total.....	6	6	2	6

(TTAWA).—Concluded.

Number of Column		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41			
V. RESPIRATORY SYSTEM.																																													
1.	Acute Bronchitis.....	13	6	...	16	3	...	16	3	...	10	3	2	1	
2.	Chronic Bronchitis.....	15	3	...	2	
3.	Broncho pneumonia.....	28	33	...	30	3	...	29	3	...	16	4	2	1	4	
4.	Pneumonia.....	47	43	...	46	13	1	34	22	4	11	4	1	1	2	1	1	1	1	1	2	2	2	6	7	9	3
5.	Pleurisy.....	5	3	...	3	7	1	1	1	4	3	
6.	Congestion of the Lungs (incl. pul. apoplexy).....	3	6	...	7	2	1	1	1		
7.	Asthma and Emphysema.....	1	1	...	2	2	2	1		
8.	Other Diseases of the Respiratory System.....	1	1	...	2	2	2	1		
Total.....		66	70	...	108	27	1	90	37	9	45	15	5	1	3	6	2	1	1	1	3	2	
VI. DIGESTIVE SYSTEM.																																													
1.	Other Diseases of Stomach (cancer excepted).....	4	2	...	5	2	...	1	6	
2.	Infantile Diarrhea and Cholera Infantum.....	61	51	...	115	115	...	105	9	1	
3.	Barrilium and Enteritis (

XII. SUICIDE.

[illegible]

CAUSES OF DEATHS BY CITIES IN 1906.—LONDON. (Including Municipalities of all classes.)

[illegible]

Local Diseases.

III. NERVOUS SYSTEM.									
1. Simple Meningitis.....	2	6	6	1	1	1	1	1	1
2. Softening of the Brain.....	5	6	5	1	2	8	1	1	1
3. Softening of the Brain.....	1	1	1	1	1	1	1	1	1
4. Paralysis without surgical cause.....	7	6	7	6	1	2	5	2	2
5. Convulsions (not puerperal).....	3	1	3	1	3	1	1	1	1
6. Other Nervous Diseases.....	1	1	1	1	1	1	1	1	1
Total	18	20	21	14	3	12	19	7	38
IV. CIRCULATORY SYSTEM.									
1. Endocarditis.....	1	1	1	1	1	1	1	1	1
2. Organic Heart Diseases.....	2	7	4	5	1	7	1	1	9
3. Angina Pectoris.....	1	1	1	1	1	1	1	1	1
4. Arteries, Atheroma, Aneurism, etc.....	2	1	1	1	1	2	1	1	3
Total	5	9	6	7	1	11	2	1	14
V. RESPIRATORY SYSTEM.									
1. Acute Bronchitis.....	2	1	2	1	2	2	1	1	3
2. Chronic Bronchitis.....	1	3	3	1	2	2	2	1	4
3. Pneumonia.....	2	8	5	4	1	3	7	1	10
Total	5	12	10	6	1	3	11	3	17
VI. DIGESTIVE SYSTEM.									
1. Other Diseases of Stomach (cancer excepted).....	1	1	2	1	1	1	1	1	2
2. Infantile Diarrhoea and Cholera Infantum.....	4	6	10	10	1	10	10	1	10
3. Diarrhoea and Enteritis (not infantile).....	1	1	1	1	1	1	1	1	1
4. Hernia and Intestinal obstructions.....	3	1	2	1	1	2	1	1	4
5. Other Diseases of the Intestines.....	1	1	1	1	1	1	1	1	1
6. Diseases of the Liver.....	1	1	2	1	1	1	1	1	2
7. Peritonitis (not puerperal).....	2	1	3	1	2	1	1	1	3
8. Lile Abscess and Appendicitis.....	1	1	1	1	1	1	1	1	1
Total	13	11	21	2	1	15	8	1	24
VII. GENITO-URINARY SYSTEM.									
1. Bright's Disease.....	3	2	3	1	1	3	2	1	5
2. Diseases of the Bladder.....	2	1	1	1	1	1	1	1	2
3. Other Diseases of the female Genital Organs.....	1	1	1	1	1	1	1	1	1
Total	5	3	5	2	1	4	3	1	6
VIII. PUERPERAL DISEASES.									
1. Puerperal Septicæmia.....	1	1	1	1	1	1	1	1	1
2. Puerperal Albuminuria and Convulsions.....	2	2	2	2	2	2	2	2	2
Total	3	3	3	3	3	3	3	3	3
IX. THE SKIN.									
(No Cases in this Class.)									
X. LOCOMOTOR SYSTEM.									
(No Cases in this Class.)									
XI. MALFORMATIONS, ETC.									
1. Still-Births.....	17	11	32	32	32	32	32	32	32
2. Congen. Debl. and Malformations.....	18	17	32	32	30	2	1	2	32
3. Senile Decay.....	13	16	9	18	2	22	5	1	29
Total	48	44	73	18	2	66	22	3	93

II OTHER GENERAL DISEASES.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1. Premia and Scepticism	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2. Tuberculosis and Scrofula	1	6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
3. Cancer	6	1	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
4. Rheumatism and Gout	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
5. Diabetes	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
6. Other General Diseases	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Total	12	11	19	4	3	20	1	1	1	1	3	1	3	5	4	1	1	2	3	2	1	2	2

Local Diseases.

III. NEPVOI'S SYSTEM

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Total.
1. Simple Meningitis.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2. Congestion and Hemorrhage of the Brain.....	1	2	1	1	3	1	1	1	1	1	1	1	1	1	1
3. Softening of the Brain.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
4. Paralysis without specified cause.....	6	6	4	1	9	1	1	1	1	2	4	3	1	1	1
5. Insanity.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
6. Intoxication.....	1	6	1	1	6	1	1	1	1	1	1	1	1	1	1
7. Convulsions (not interperit).....	2	1	1	1	5	1	1	1	1	1	1	1	1	2	1
8. Other Nervous Diseases.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
13.....	13	14	.....	.....	12	15	.....	6	1	1	1	1	1	1	2
14.....	19	8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total.....	13	14	.....	.....	12	15	.....	6	1	1	1	1	1	1	2

IV. DISEASES OF CIRCULATORY SYSTEM

[illegible]

V. RESPIRATORY SYSTEM.

[illegible]

VI. LOGESTIVE SYSTEM.

1. Other Diseases of Stomach (cancer excepted).....	1	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2</
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VILCENTO PRIMARY SYSTEM.

1. Bright's Disease	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
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ST. THOMAS.—*Concluded.*

Number of Column.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41

VIII. PUERPERAL DISEASES.

1. Puerperal Albuminuria and Convulsions.....

Total.....

IX. THE SKIN

(No diseases in this class.)

X. LOCOMOTOR SYSTEM.

(No diseases in this class.)

XI. MALFORMATIONS, ETC.

1. Still Births.....

2. Congenital Deblity and Malformation.....

3. Senile Decay.....

Total.....

XII. SUICIDE.

1. Strangulation.....

Total.....

XIII. ACCIDENTS.

1. Fractures and Dislocations.....

2. Railway Accidents.....

3. Other Accidents.....

Total.....

XIV. ILL-DEFINED CAUSES.

1. Dropsy.....

2. Tumors.....

3. Heart Failure.....

Total.....

Total from all causes.....

95 73 127 40 1 69 98 1 36 4 1 2 3 2 8 4 5 6 7 9 19 22 27 13 9 17 29 18 17 8 8 12 13 14 10 168

Number of Column.

Number of Column.		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41				
V. RESPIRATORY SYSTEM.																																														
1.	Acute Bronchitis	...	2	...	2	...	2	...	1	1	...	1	...	1	...	1	...	1	...	2	...	1	...	1	...	1	...	1	...	1	...	1	...	1	...	1	...	1	...	1	...	2	1			
2.	Broncho-pneumonia	...	2	...	2	...	2	...	1	3	...	1	...	1	...	1	...	1	...	1	...	1	...	1	...	1	...	1	...	1	...	1	...	1	...	1	...	1	...	1	...	1	...	6	1	
3.	Pneumonia	...	6	...	5	...	5	...	3	2	...	1	...	1	...	1	...	1	...	1	...	1	...	1	...	1	...	1	...	1	...	1	...	1	...	1	...	1	...	1	...	1	...	2	1	
4.	Congestion of the Lungs (incl. pul. apoplexy)	...	2	...	2	...	2	...	1	1	1	1	...		
5.	Other Diseases of Respiratory System	...	1	1	...		
Total		...	11	...	11	...	11	...	6	8	...	1	...	1	...	1	...	1	...	1	...	1	...	1	...	1	...	1	...	1	...	1	...	1	...	1	...	1	...	1	...	1	...	15	...	
VI. DIGESTIVE SYSTEM.																																														
1.	Other Diseases of the Stomach (Cancer exclud.)	...	1	1	...	
2.	Infan. Diarr. and Cholera Infantum	...	2	...	9	...	9	...	9	9	...	
3.	Diarrhea and Enteritis (not infantile)	...	1	...	1	...	1	...	1	1	...		
4.	Hernia and Intestinal obstructions	...	1	...	1	...	1	...	1	1	...		
5.	Diseases of the Liver	...	1	...	2	...	2	...	1	2	...	
6.	Peritonitis (not puerperal)	...	1	...	1	...	1	...	1	1	...		
7.	Blac Abscess and Appendicitis	...	1	...	1	...	1	...	1	1	...		
Total		...	4	...	12	...	14	...	11	5	...	7	...	2	...	2	...	2	...	2	...	2	...	2	...	2	...	2	...	2	...	2	...	2	...	2	...	2	...	2	...	2	...	16	...	
VII. GENITO-URINARY SYSTEM.																																														
1.	Bright's Disease	...	4	...	5	...	4	...	3	6	1	...	1	...	1	...	1	...	1	...	1	...	1	...	1	...	1	...	1	...	1	...	1	...	1	...	1	...	1	...	9	...	
2.	Other Diseases of the Kidneys and Adnexa	...	1	...	1	...	1	...	1	1	...		
Total		...	4	...	6	...	5	...	3	7	1	...	1	...	1	...	1	...	1	...	1	...	1	...	1	...	1	...	1	...	1	...	1	...	1	...	1	...	1	...	10	...	
VIII. PUERPERAL DISEASES.																																														
1.	Puerperal Albuminuria and Convulsions	...	1	...	1	...	1	1	1	...		
Total		...	1	...	1	...	1	...	1	1	...		
IX. THE SKIN (No Cases in this Class.)																																														
X. LOCOMOTOR SYSTEM. (No Cases in this Class.)																																														
XI. MALFORMATIONS, ETC.																																														
1.	Still Births	...	8	...	10	...	18	...	18	18	...		
2.	Congen. Deblility and Malformation	...	6	...	9	...	15	...	15	15	...		
3.	Scutle Decay	...	3	...	7	...	4	...	6	10	...		
Total		...	17	...	26	...	37	...	33	...	33	...	33	...	33	...	33	...	33	...	33	...	33	...	33	...	33	...	33	...	33	...	33	...	33	...	33	...	33	...	33	...	33	...	13	...
XII. SUICIDE.																																														
1.	Poison	...	1	...	1	...	1	...	1	1	...		
Total		...	1	...	1	...	1	...	1	1	...		

VIII. PUERPERAL DISEASES.

1. Puerperal Albuminuria and Convulsions.
2. Other accidents of Pregnancy, sudden death.

Total.....

IX. THE SKIN, ETC.

1. Erysipelas.
2. Other Diseases of the skin (excepted).

Total.....

X. LOCOMOTOR SYSTEM.

(No cases in this class.)

XI. MALFORMATIONS, ETC.

1. Still-Births.
2. Congenital Deformity and Malformations.
3. Other Diseases of Infancy.
4. Senile Decay.

Total.....

XII. SUICIDE.

(No cases in this class.)

XIII. ACCIDENT.

1. Fractures and Dislocations.
2. Drowning.
3. Railways.
4. Other Accidents.

Total.....

XIV. ILL-DEFINED CAUSES.

1. Tumors.
2. Other Ill-Defined Causes.
3. Heart Failure.

Total.....

Total from all causes.....

116 91 141 66 100 106 1 54 3 2 8 8 8 4 8 10 12 9 18 26 32 12 15 17 20 18 14 16 14 18 22 19 21 207

[illegible]

CAUSES OF DEATHS BY CITIES IN 1905.—PETERBOROUGH.

[illegible]

VI. DIGESTIVE SYSTEM.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
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11 R.G.

CAUSES OF DEATHS BY TOWNS IN 1905.—CORNWALL.

General Diseases.	Sex.	Nativity.	Social Condition.	Ages.										Months.												Totals.		
				Under 5.										Not given.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.		
				0-1	1-2	2-3	3-4	4-5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-59	60-69	70-79	80 and over.							
I. COMMUNICABLE (EPIDEMIC) DISEASES.																												
1. Typhoid fever.....	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2. Scarlet fever.....	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Total.....	4	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
II. OTHER GENERAL DISEASES.																												
1. Pycemia and Septicemia.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2. Tuberculosis and Scrofula.....	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
3. Cancer.....	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
4. Rheumatism and Gout.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
5. Diabetes.....	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
6. Other General Diseases.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Total.....	11	12	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
III. LOCAL DISEASES.																												
1. Simple Meningitis.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2. Congestion and Hemorrhage of the Brain.....	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
3. Paralysis without specified cause.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
4. Other Nervous Diseases.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Total.....	11	12	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
IV. CIRCULATORY SYSTEM.																												
1. Organic Heart Diseases.....	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Total.....	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
V. RESPIRATORY SYSTEM.																												
1. Acute Bronchitis.....	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
2. Chronic Bronchitis.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
3. Broncho-pneumonia.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
4. Pneumonia.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
5. Congestion of the Lungs (inc. pul. apoplexy).....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
6. Other Diseases of the Respiratory System.....	4	5	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
Total.....	4	5	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7

Number of Column.

VI. DIGESTIVE SYSTEM.																																		
1. Ulcer of the Stomach.....	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
2. Other Diseases of Stomach (cancer excepted).....	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
3. Infant Diarr. (cholera infant.).....	6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
4. Biliary and Enteritis (not infantile).....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
5. Other Diseases of the Intestines.....	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
6. Peritonitis (not puerperal).....	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
Total.....	10	9	15	3	1	10	9	5	2	1	2	1	3	1	2	1	3	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	19	
VII. GENITO-URINARY SYSTEM.																																		
1. Bright's Disease.....	1	2	3	3	3	1	2	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	
2. Other Diseases of the Kidneys and Uterus.....	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	
Total.....	4	2	6	6	6	4	2	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	
VIII. PULMONARY DISEASES.																																		
(No Diseases in this Class.)																																		
IX. THE SKIN.																																		
(No Diseases in this Class.)																																		
X. LOCOMOTOR SYSTEM.																																		
1. Diseases of Bones and Joints.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Total.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
XI. MALFORMATIONS, ETC.																																		
1. Still-Births.....	3	2	14	13	14	5	5	13	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
2. Congen. Deaf. and Malformations.....	6	8	13	4	2	13	6	13	6	13	6	13	6	13	6	13	6	13	6	13	6	13	6	13	6	13	6	13	6	13	6	13	6	13
3. Senile decay.....	12	7	13	1	2	13	6	13	6	13	6	13	6	13	6	13	6	13	6	13	6	13	6	13	6	13	6	13	6	13	6	13	6	13
Total.....	21	17	32	4	2	19	13	32	18	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	38	
XII. SUICIDE.																																		
(No Diseases in this Class.)																																		
XIII. ACCIDENTS.																																		
1. Fractures and Dislocations.....	1	1	2	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
2. Drowning.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
3. Railways.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
4. Burns and Scalds.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Total.....	2	3	4	4	4	3	2	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	5
XIV. UNDEFINED CAUSES.																																		
1. Other Undefined Causes.....	2	1	2	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	
Total.....	2	1	2	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	
Total from all causes.....	71	55	97	23	6	56	53	17	24	5	1	6	2	2	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	126	

V. RESPIRATORY SYSTEM.									
1. Acute Bronchitis.....	1	2	1	1	1	1	1	1	1
2. Chronic Bronchitis.....	1	2	1	1	1	1	1	1	1
3. Broncho-pneumonia.....	1	2	1	1	1	1	1	1	1
4. Pneumonia.....	5	3	4	3	1	1	1	2	1
5. Congestion of the Lungs (including pul-apop.)	1	1	1	1	1	1	1	1	1
Total.....	8	8	7	8	5	11	1	3	16
VI. DIGESTIVE SYSTEM.									
1. Other Diseases of Stomach (cancer excepted)	1	1	1	1	1	2	1	1	1
2. Infantile Diarrhea and Cholera Infantum.....	2	2	1	1	1	4	1	2	1
3. Diarrhea and Enteritis (not infantile).....	2	1	1	1	1	1	1	1	1
4. Diseases of the Liver.....	2	1	1	2	1	4	1	2	1
5. Peritonitis (not puerperal).....	2	1	1	1	1	1	1	1	1
6. Ills Abscess and Abscesses.....	2	1	3	1	1	3	1	1	3
Total.....	7	6	8	4	3	7	4	2	15
VII. GENITO-URINARY SYSTEM.									
1. Bright's Disease.....	1	2	2	1	1	3	1	1	3
Total.....	1	2	2	1	1	3	1	1	3
VIII. PUERPERAL DISEASES.									
1. Other Accidents of Pregnancy, sudden death.	1	1	1	1	1	1	1	1	1
Total.....	1	1	1	1	1	1	1	1	1
IX. DISEASES OF THE SKIN.									
(No cases in this class.)									
X. LOCOMOTOR SYSTEM.									
(No cases in this class.)									
XI. MALFORMATIONS, ETC.									
1. Still-Births.....	2	5	1	1	1	1	1	1	7
2. Congen. Debil. and Malformations.....	6	7	13	8	1	12	1	1	13
3. Senile Decay.....	1	1	1	1	1	1	1	1	333
Total.....	14	19	25	8	21	12	19	2	1
XII. SUICIDE.									
1. Poison.....	1	1	1	1	1	1	1	1	1
2. Strangulation.....	1	1	1	1	1	1	1	1	1
Total.....	2	2	2	2	2	2	2	2	2
XIII. ACCIDENTS.									
1. Drowning.....	1	1	1	1	1	1	1	1	1
2. Railways.....	1	1	1	1	1	1	1	1	1
3. Other accidents.....	2	1	1	1	1	1	1	1	2
Total.....	4	3	3	3	3	3	3	3	4
XIV. ILL-DEFINED CAUSES.									
1. Dropsy.....	2	2	1	1	1	2	1	1	2
2. Other Ill-defined Causes.....	1	1	1	1	1	1	1	1	1
3. Heart Failure.....	1	1	1	1	1	1	1	1	1
Total.....	4	4	3	3	3	4	3	3	4
Total from all causes.....	53	59	65	39	8	55	56	1	112

VII. GENITO-URINARY SYSTEM.

Figure 1 displays a 10x10 grid of plots showing the evolution of the number of nodes in the network over time for different values of α (0.0 to 0.9) and β (0.0 to 0.9). The x-axis represents time (0 to 100) and the y-axis represents the number of nodes (0 to 100). The plots show that the number of nodes generally increases over time, with the rate of increase being higher for higher values of α and β .

VIII. PNEUMONAL DISEASES.

(No cases in this class.)

IX. DISEASES OF THE SKIN.

(No cases in this class.)

X. LOCOMOTOR SYSTEM.

(None in this class.)

XI. MALFORMATIONS, ETC.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
2	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	76	78	80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110	112	114	116	118	120	122	124	126	128	130	132	134	136	138	140	142	144	146	148	150	152	154	156	158	160	162	164	166	168	170	172	174	176	178	180	182	184	186	188	190	192	194	196	198	200
3	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60	63	66	69	72	75	78	81	84	87	90	93	96	99	102	105	108	111	114	117	120	123	126	129	132	135	138	141	144	147	150	153	156	159	162	165	168	171	174	177	180	183	186	189	192	195	198	201	204	207	210	213	216	219	222	225	228	231	234	237	240	243	246	249	252	255	258	261	264	267	270	273	276	279	282	285	288	291	294	297	300
4	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72	76	80	84	88	92	96	100	104	108	112	116	120	124	128	132	136	140	144	148	152	156	160	164	168	172	176	180	184	188	192	196	200	204	208	212	216	220	224	228	232	236	240	244	248	252	256	260	264	268	272	276	280	284	288	292	296	300																									
5	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300																																								
6	6	12	18	24	30	36	42	48	54	60	66																																																																																									

XII. SUMMARY.

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099
1990	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099

XIII. ACCIDENTS.

19	3	...	10	11	1	15	8	4	...	1	...	3	1	6	5	1	2	1	1	...	1	...	1	4	1	1	21	35	22
1	1	...	1	5	5	...	9	1	...	1	...	1	2	1	5	1	1	1	1	...	1	...	1	1	1	1	1	1	1
1	5	1	...	1	5	1	3	1	...	1	...	1	3	1	5	1	1	1	1	...	1	...	1	1	1	1	1	1	1
1	1	...	1	1	...	2	1	...	1	...	1	1	1	1	1	1	1	1	...	1	...	1	1	1	1	1	1	1	1
1	1	...	1	1	...	1	1	...	1	...	1	1	1	1	1	1	1	1	...	1	...	1	1	1	1	1	1	1	1

XIV. WELL-DEFINED CATALYSTS.

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100
1990	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100											

Total from all causes:

[illegible]

VI. DIGESTIVE SYSTEM.																								
1. Other Diseases of the Stomach (Cancer excepted).....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2. Infantile Diarrhoea and Cholera Infantum.....	2	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	4
3. Diarrhoea and Enteritis (not infantile).....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
4. Diseases of the Liver.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
5. Peritonitis (not puerperal).....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Total.....	4	4	5	3	5	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	8
VII. GENITRO URINARY SYSTEM.																								
1. Bright's Disease.....	3	1	3	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	4
2. Other Diseases of the Kidneys and Adrena.....	2	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3
3. Diseases of the Bladder.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Total.....	6	2	6	2	4	4	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	8
VIII. PUERPERAL DISEASES.																								
(No cases in this Class.)																								
IX. THE SKIN.																								
(No cases in this Class.)																								
X. LOCOMOTOR SYSTEM.																								
(No cases in this Class.)																								
XI. MALFORMATIONS, ETC.																								
1. Still-Births.....	3	2	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
2. Congenital Deformity and Malformations.....	10	5	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
3. Senile Decay.....	10	8	7	11	1	17	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	18
Total.....	23	15	27	11	21	17	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	38
XII. SUICIDE.																								
(No cases in this Class.)																								
XIII. ACCIDENTS.																								
1. Gunshot.....	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
2. Railways.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
3. Other Accidents.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Total.....	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
XIV. ILL-DEFINED CAUSES.																								
1. Heart Failure.....	2	1	3	3	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3
Total.....	2	1	3	3	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3
Total from all causes.....	58	59	83	34	50	62	5	26	1	1	1	2	4	4	7	4	4	5	2	15	20	10	7	117

	57	47	79	25	55	49	33	2	3	10	11	7	2	6	8	10	8	7	8	104
VI. DIGESTIVE SYSTEM.																				
1. Infan. Diarr. and Cholera Infantum.....	1	4	8	1	8	8	1	6										1	3	1
2. Other Diseases of the Intestines.....	1	1	1	1	1	1	1	1										1		1
Total.....	4	5	9	2	9	9	2	7										2	3	2
VII. GENITO-URINARY SYSTEM.																				
1. Bright's Disease	4	3	6	1	7	7						3	2	1	1	1	1	1	1	1
Total.....	4	3	6	1	7	7						3	2	1	1	1	1	1	1	1
VIII. PUERPERAL DISEASES.																				
(No cases in this class.)																				
IX. THE SKIN.																				
1. Other Diseases of the Skin, etc.....	1		1		1	1														1
Total.....	1		1		1	1														1
X. LOCOMOTOR SYSTEM.																				
(No cases in this class.)																				
XI. MALFORMATIONS, ETC.																				
1. Still-Births.....	6	4	10	10	10	10	10	10										1	1	2
2. Congenital Deblity and Malformations.....	6	4	10	10	10	10	10	10										2	1	1
3. Other Diseases of Infancy.....	1																			1
4. Senile Decay.....	10	10	9	11	3	17						3	6	11	3	2	2	1	1	1
Total.....	23	18	30	11	24	17	20	1				3	6	11	4	5	4	5	1	2
XII. SUICIDE.																				
1. Other Methods.....	1		1		1	1														1
Total.....	1		1		1	1														1
XIII. ACCIDENT.																				
1. Fractures and Dislocations.....	1		1		1	1														1
2. Railways.....	4	3	3	1	2	2														1
3. Burns and Scalds.....	1	1	1		1	1														1
4. Other Accidents.....	3	1	2		1	2														3
Total.....	9	1	7	3	5	5	1					1	2	1	1	1	2	1	1	1
XIV.—ILL-DEFINED CAUSES.																				
1. Dropsy.....	1		1		1	1														1
2. Heart Failure.....	1	1	2		1	1														2
Total.....	1	2	3		1	2														3
Total from all causes.....	57	47	79	25	55	49	33	2	3	10	11	7	2	6	8	10	8	7	8	104

CAUSES OF DEATHS BY TOWNS IN 1905.—OWEN SOUND.

[illegible]

12 R.G.

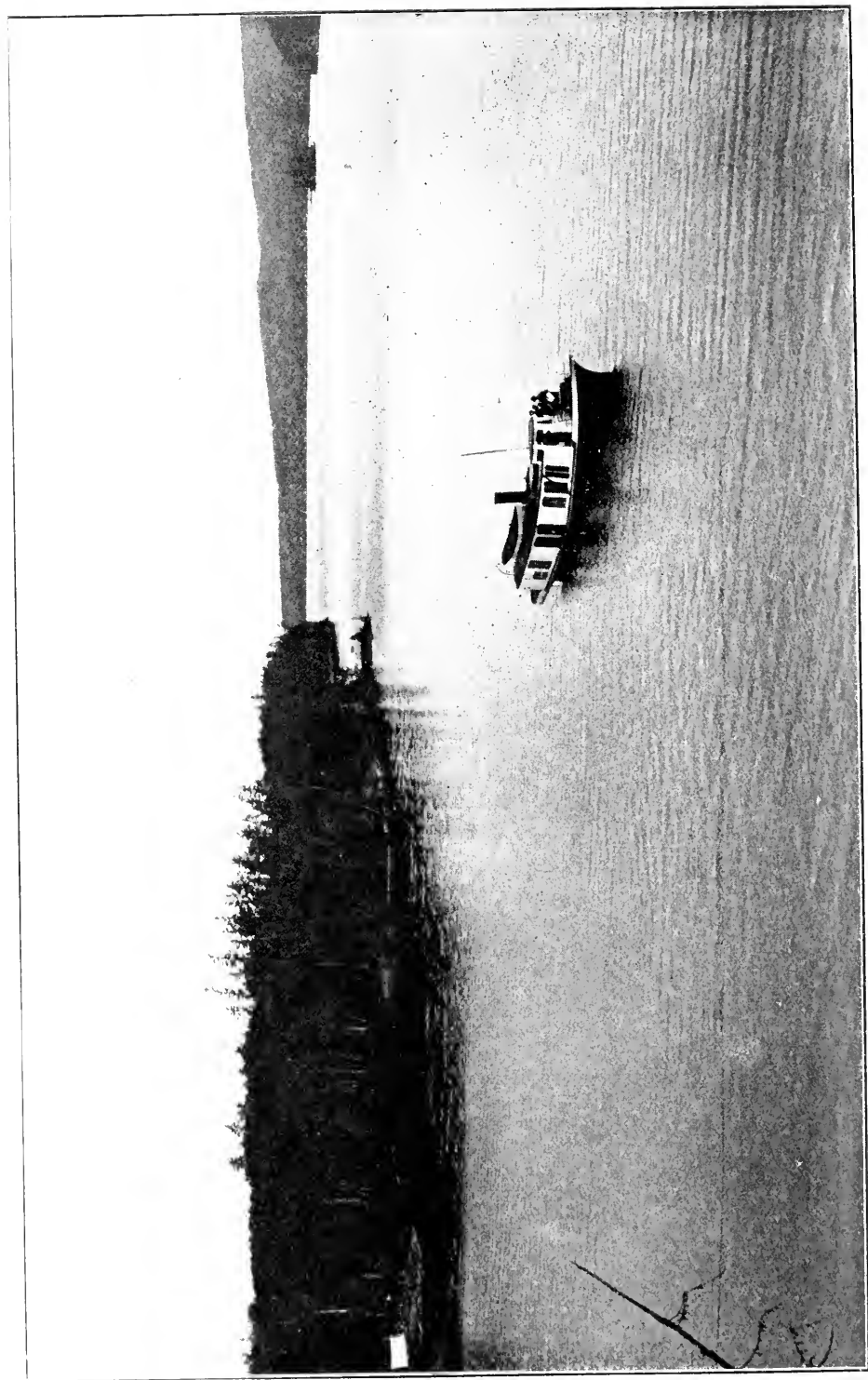
CAUSES OF DEATHS BY TOWNS IN 1905.—SARINIA.

[illegible]

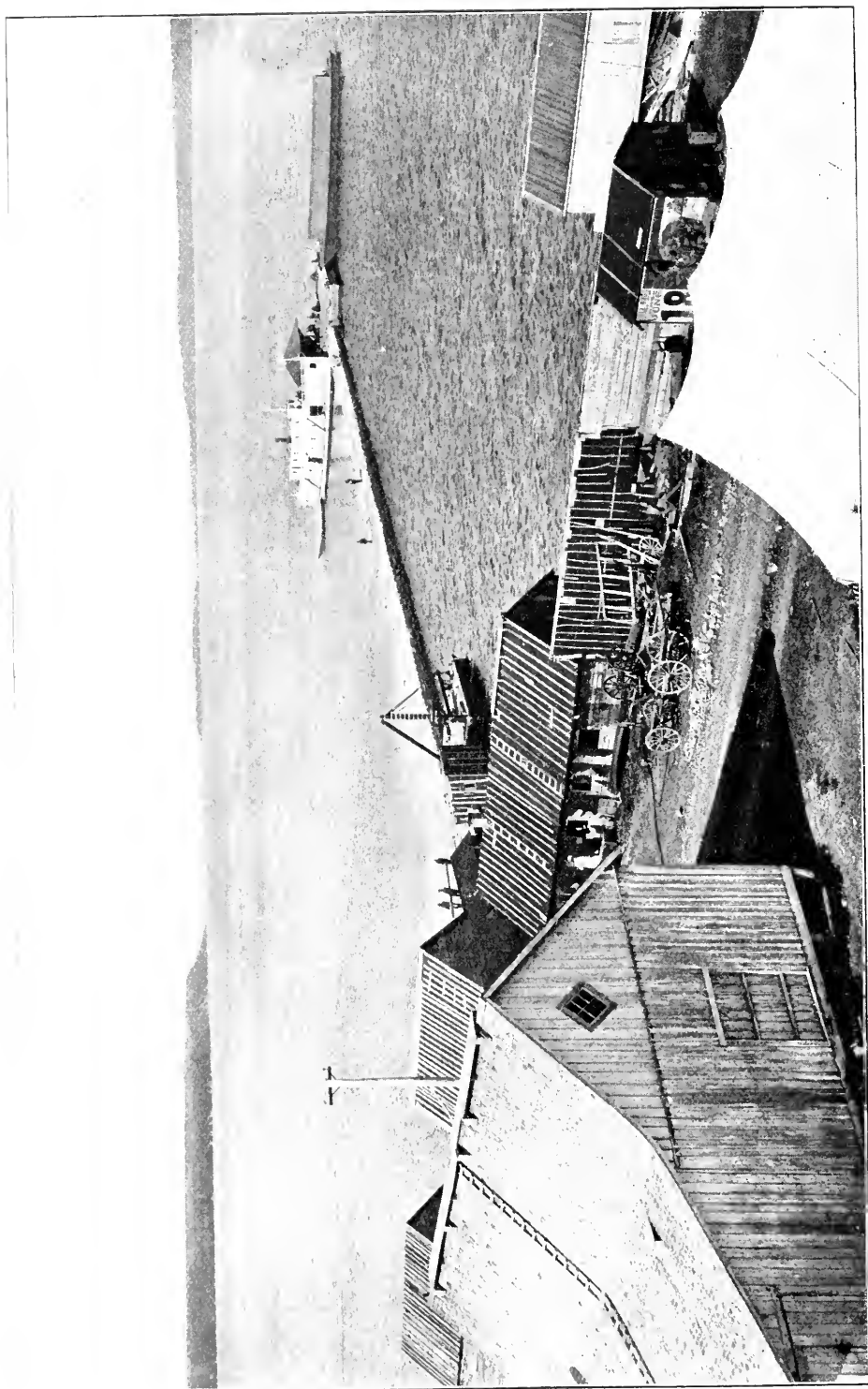
CAUSES OF DEATHS BY TOWNS IN 1905.—SAULT STE. MARIE.

General Diseases.	Sex.	Nativity.	Social Con.	Under 5.					Months.												Total.				
				Under 5.																					
				0-1	1-2	3-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-59	60-69	70-79	80 and over.						
Number of Column.																									
I. COMMUNICABLE (EPIDEMIC) DISEASES.																									
1. Typhoid Fever.....	10	2	3	5	4	3	1	1	2	2	1	2	2	2	2	2	2	2	2	2	12				
2. Diphtheria and Croup.....	1	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	12				
3. Other Epidemic Diseases.....	11	1	6	5	4	12	3	1	1	1	2	2	2	2	2	2	2	2	2	2	15				
Total.....																									
II. OTHER GENERAL DISEASES.																									
1. Tuberculosis and Scrofula.....	6	9	10	5	6	6	3	1	2	2	1	1	2	3	2	1	2	1	2	1	15				
2. Cancer.....	3	3	2	1	3	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1	3				
3. Rheumatism and Gout.....	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2				
4. Diabetes.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1				
5. Other General Diseases.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1				
Total.....																									
Local Diseases.																									
III. NERVOUS SYSTEM.																									
1. Simple Meningitis.....	2	1	3	1	1	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	3				
2. Congestion and Hemorrhage of the Brain.....	3	3	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3				
3. Softening of the Brain.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3				
4. Paralysis without specified cause.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2				
5. Convulsions (not puerperal).....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2				
6. Other Nervous Diseases.....	2	2	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2				
Total.....																									
IV. DISEASES OF CIRCULATORY SYSTEM.																									
1. Organic Heart Diseases.....	4	7	6	3	2	5	6	2	2	1	1	1	3	3	1	1	2	1	1	1	11				
Total.....																									
V. RESPIRATORY SYSTEM.																									
1. Acute Bronchitis.....	3	2	3	1	1	5	5	1	1	1	1	1	1	1	1	1	1	1	1	1	5				
2. Pneumonia.....	3	2	3	1	1	5	5	1	1	1	1	1	1	1	1	1	1	1	1	1	5				
Total.....																									
1. Acute Bronchitis.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1				
2. Pneumonia.....	6	5	9	2	6	4	1	5	1	1	1	2	3	1	1	1	1	1	1	1	11				
Total.....																									
1. Acute Bronchitis.....	6	6	10	2	7	4	1	6	1	1	1	2	4	1	1	1	1	1	1	1	12				

[illegible]



Lake Temagami.



Lake Temiskaming from Haileybury.

FIFTH ANNUAL REPORT

OF THE

Temiskaming and Northern Ontario Railway Commission

TO

December 31, 1906.

PRINTED BY ORDER OF
THE LEGISLATIVE ASSEMBLY OF ONTARIO



TORONTO

Printed and Published by L. K. CAMERON, Printer to the King's Most Excellent Majesty
1907.

WARWICK BROS & RUTTER, Limited, Printers
TORONTO

TO HIS HONOUR WILLIAM MORTIMER CLARK, K.C.,
Lieutenant-Governor of Ontario:

MAY IT PLEASE YOUR HONOUR:—

I herewith beg to present for your consideration the fourth annual report of the Temiskaming and Northern Ontario Railway Commission, to December 31st, 1905.

J. O. REAUME,
Minister of Public Works.

TORONTO, February 5th, 1907.

HON. J. O. REAUME,
Minister Public Works Ontario,
Toronto.

SIR, I have the honor, by direction, to submit to you for presentation to the Legislature the fifth annual report of the Temiskaming and Northern Ontario Railway Commission for the year ended December 31st, 1906.

I have the honour to be,

Sir,

Your obedient servant,

A. J. MCGEE,
Secretary-Treasurer.

The Temiskaming and Northern Ontario Railway Commission.

J. L. ENGLEHART, Chairman Petroha.
DENIS MURPHY Ottawa.

CHIEF OFFICERS :

G. A. MCCARTHY, Chief Engineer.....North Bay.
J. H. BLACK, Superintendent.....North Bay.
H. W. PEARSON, Secretary-Treasurer Toronto.
A. J. MCGEE, General Accountant.....Toronto.
ARTHUR ALLAN, Master Mechanic.....North Bay.
W. D. CUNNEYWORTH, Freight and Passenger Agent.....North Bay.
ARTHUR A. COLE, Mining Engineer.....Cobalt.
V. T. BARTRAM, Purchasing Agent.....North Bay.
WILLIAM YOUNG, RoadmasterNorth Bay.
CECIL B. SMITH, Consulting EngineerToronto.

ADDENDUM :

Mr. FREDERICK DANE has been appointed Commissioner in place and stead of Cecil B. Smith, resigned.

Mr. A. J. MCGEE has been appointed Secretary-Treasurer, in place and stead of H. W. Pearson, resigned.

Mr. H. F. MACDONALD has been appointed Acting Accountant, in place and stead of A. J. McGee, appointed Secretary-Treasurer.

TEMISKAMING AND NORTHERN ONTARIO RAILWAY COMMISSION.

GENERAL REMARKS.

On the 31st of December, 1906, the Commission was operating 138 miles of railway, *i. e.*, from North Bay to Englehart, while there was under construction an additional 75 miles, which, when completed, will bring the total mileage to approximately 213 miles.

The railway having been in operation for a period of two years it has enabled the Commissioners to submit comparative statements of earnings and expenditure in connection therewith for period so named, *i. e.*, years 1905 and 1906, and in addition complete details are given regarding freight and passenger traffic telephone, telegraph, express, mail and other earnings; statements of the amount expended on account of surveys and construction are also included.

Full particulars are also given in connection with mining leases granted by the Commission and of the securing of and the sales of lots in the various townsites.

The report of the Chief Engineer covering surveys and construction work for the year is included, together with reports from the Superintendent, Freight and Passenger Agent, Master Mechanic and Mining Engineer.

Appended also are copies of contracts entered into for the building of rolling stock, round houses, telegraph and telephone lines, coal chutes and trestles, together with copies of miscellaneous agreements.

On November 1st Mr. C. B. Smith resigned from the Chairmanship of the Board, and Mr. J. L. Englehart was appointed in his stead. Mr. Smith, however, retains his connection with the Commission in the capacity of Consulting Engineer.

During the year the dual position of Superintendent and Traffic Manager was separated, Mr. Black retaining the former position and Mr. W. D. Cunneyworth receiving the appointment of Freight and Passenger Agent. The mining interests of the Commission requiring an expert in charge of this department, the services of Mr. Arthur A. Cole were secured. A purchasing department was also organized, Mr. V. T. Bartram being appointed Purchasing Agent.

INSURANCE.

The following is a statement of the Fire, Employers' Liability and Guarantee insurance in force December 31st, 1906:—

<i>Fire.</i>	
On rolling stock	\$473,560 78
“ station buildings, shelter stations and agents' houses.....	41,987 56
“ section houses	17,087 60
“ water tanks and supports	29,268 53
“ freight and engine sheds	11 688 23
“ storehouses and contents, track scale, carpenter shop, tool shed, machine shop and machinery, shafting, gearing, belting, tools and utensils in same.....	48,735 45
	<hr/>
	\$622,346 15

The rate on all the above is 49 cents per \$100.00. In addition \$8,000.00 insurance is in force on the buildings and contents situate on the right-of-way into North Bay, upon which tariff rates prevail.

Employers' Liability.

	Amount.	Rate.
On Commissioners and Executive staff.....	\$ 72,000 00	\$ 75 per \$100
" operating employees	140,000 00	2 10 per \$100

Guarantee.

On officers	\$14,000 00
" Chief Clerks, etc.	14,500 00
" station agents	11,500 00
	<hr/>
	\$40,000 00

Rate—30 cents per \$100.00.

BRANCH LINES.

Kerr Lake Branch.

Owing to the rapidly increasing extent of mining operations in the Cobalt District and the apparent urgent necessity of better shipping facilities, the Commission took into consideration the advisability of constructing a branch line from a point at or near the Town of Cobalt into the Kerr Lake District, a distance of about four or five miles. A special report was obtained upon the volume and extent of traffic which might be expected in the event of such a branch being constructed, and upon receipt of this and other necessary information, surveys and location of the branch were authorized and tenders were called for the construction of same. For tenders see pages 8 and 9.

The tender of Mr. A. B. Spencer, being the lowest, was accepted and instructions were given for the preparation of the necessary contract.

Subsequently contract was transferred by A. B. Spencer to McQuigge & Hunt.

Haileybury Spur.

Reference to list of contracts and agreements published in this report will show copy of an agreement entered into with the Empire Lumber Co. by the Commission for the moving of a large quantity of logs from Haileybury to the mills of the former at Latchford. This necessitates the building of a spur from the main line of the railway at Haileybury to the wharf at that place. Two locations were made and after careful consideration it was decided to adopt what is known as the lower line, the length of this line being approximately one and three-quarter miles. Tenders were called for the construction of this spur. For tenders see pages 10 and 11.

The tender of Messrs. McQuigge & Hunt, being the lowest, was accepted and construction will be proceeded with as rapidly as possible.

Charlton Branch.

In the month of April a petition was received from 83 settlers in the District of Nipissing asking the Commission to take into consideration the advisability of constructing a branch line from the main line of the railway at the first crossing of the Blanche River (Englehart), to the Village of Charlton, situated at the foot of Long Lake. As in the case of the Kerr Lake branch, a special commercial report was obtained and the Chief Engineer was asked to make an exploration of the country through which the line would pass, and if said exploration warranted it to run a trial line. Upon receipt of the report of the yearly traffic (both in and out) which might be expected from the construction of this line, and the report of the Chief Engineer of the result of his exploration and trial line, the Commission gave the matter fullest consideration, with the result that instructions were given for the location of the line. The length of this branch is approximately eight miles and tenders for the construction thereof were received simultaneously with those for the Kerr Lake branch and Haileybury spur. For tenders see pages 12 and 13.

The Canadian Construction Company, being the lowest bidders, were awarded the contract, and work in connection therewith will be proceeded with, with all possible despatch.

TENDERS AND EXTENSIONS.

No.	DESCRIPTION.	Unit of Measurement.	Estimated quantities.	A. B. Spencer, Niagara Falls.		Canadian Const'n Co., Montreal.		R. P. New
				Rate.	Amount.	Rate.	Amount.	Rate.
1	Clearing	per acre	20	\$ 28 00	\$ 560 00	\$ 40 00	\$ 800 00	\$ 45 00
2	Grubbing	do	115	00		80 00		150 00
3	Close-cutting	do	28	00		40 00		40 00
4	Cross-logging	do	250	00		1,000 00		800 00
5	Solid rock excavations	per cu. yd.	370	00	1 60 59,200 00	1 50 55,500 00		1 55
6	Loose rock	do	45			60		75
7	All other material	do	90	00	35 3,150 00	33 2,970 00		35
8	Solid rock in wet foundations	do	3	25		3 00		4 00
9	Loose rock in wet foundations	do	1	60		1 00		2 00
10	All other materials	do	1	25		50		1 75
11	Masonry, 1st class	do	15	00		15 00		18 00
12	Masonry, 2nd class	do	9	00		10 00		12 00
13	Masonry, dry	do	3	00	5 50 1,650 00	6 00 1,800 00		6 00
14	Concrete	do		8 00		11 00		11 00
15	Concrete culvert pipe, 36in. dia. in place	per lin. ft.		6 00		5 00		5 00
16	Concrete culvert pipe, 30in. dia. in place	do		5 00		4 00		4 00
17	Double strength vitrified culvert pipe, 24in. dia. in place	do		1 00		2 80		2 50
18	Double strength vitrified culvert pipe, 18in. dia. in place	do		75		1 85		1 75
19	Double strength vitrified culvert pipe, 12in. dia. in place	do		50		1 10		1 25
20	Rip-rap, hand laid	per cu. yd.	2	00		2 50		3 50
21	Rip-rap, loose laid	do	1	50		2 00		2 50
22	Crib filling	do	4	00		2 00		2 00
23	Paving	do	3	50		3 50		3 50
24	Blind stone drains	do	1	50		2 00		2 00
25	Piling driven under cap.	per lin. ft.	60	00	22 1,320 00	38 2,280 00		30
26	Piling delivered	do		10		22		12
27	Ties on right of way	per tie		12		15		20
28	Telegraph poles on right of way	per pole		60		40		1 00
29	Fence posts on right of way ..	per post		7		10		8
30	Permanent trestles, timber built in, including iron	per ft. B.M.	250	00	30 00 7,500 00	45 00 11,250 00		48 00
31	Temporary trestle, timber consisting of sills, caps, posts and stringers built in, including iron	per lin. ft.		25		35		30
32	Temporary trestle timber, consisting of all classes of braces built in, including iron	do		8		9		18
33	Culverts, timber built in, including iron	per ft. B.M.	500	00	25 00 1,250 00	32 00 1,600 00		30 00
34	Culvert timber delivered	do		20 00		24 00		25 00
35	Cribs, timber built in including iron	do		20 00		32 00		40 00
36	Cribs, timber delivered	do		30 00		24 00		30 00
37	Track laying	per mile						
38	Switches, including frogs	per turnout						
39	Ballasting, including surfacing	per cu. yd.						
40	Trestle filling by train	do						
41	Fencing, including gates	per rod		90		1 00		1 50
Total					74,630 00		76,200 00	

KERR LAKE BRANCH.

Herron, Liskeard.	Swan Swanson, North Bay.		A. R. Macdonell New Liskeard.		Wyse Middle- mist, Toronto.		Bailey-Johnson Tenders, Shawinigan Falls		McQuigge & Hunt, Arnprior.		
Amount.	Rate.	Amount.	Rate.	Amount.	Rate.	Amount.	Rate.	Amount.	Rate.	Amount.	
\$	\$ c.	\$	\$ c.	\$	\$ c.	\$	\$ c.	\$	\$ c.	\$	
900 00	40 00	800 00	50 00	1,000 00	50 00	1,000 00	60 00	1,200 00	45 00	900 00	1
.....	150 00	.....	150 00	.....	185 00	.....	15 00	.....	150 00	.....	2
.....	25 00	.....	30 00	.....	50 00	.....	10 00	.....	20 00	.....	3
.....	600 00	.....	900 00	.....	350 00	.....	200 00	.....	750 00	.....	4
57,350 00	1 60	59,200 00	1 55	57,355 00	1 75	64,750 00	1 76	65,120 00	1 63	60,310 00	5
.....	45 ..	.....	45 ..	.....	90 ..	.....	1 77 ..	.....	65 ..	.....	6
3,150 00	30 ..	2,700 00	33 ..	2,970 00	32 ..	2,880 00	40 ..	3,600 00	25 ..	2,250 00	7
.....	3 00	.....	3 50	.....	2 50	.....	12 00	.....	3 00	.....	8
.....	1 00	.....	1 75	.....	1 25	.....	12 00	.....	2 00	.....	9
.....	1 00	.....	1 75	.....	75 ..	.....	12 00	.....	1 00	.....	10
.....	18 00	.....	15 00	.....	12 50	.....	32 00	.....	18 00	.....	11
.....	15 00	.....	12 00	.....	9 00	.....	28 00	.....	16 00	.....	12
1,800 00	4 50	1,350 00	6 00	1,800 00	6 00	1,800 00	4 75	1,425 00	5 00	1,500 00	13
.....	10 50	.....	12 00	.....	8 00	.....	9 00	.....	11 00	.....	14
.....	4 50	.....	9 00	.....	4 25	.....	2 18	.....	2 10	.....	15
.....	4 00	.....	8 00	.....	3 25	.....	2 18	.....	1 90	.....	16
.....	3 50	.....	2 00	.....	1 65	.....	1 70	.....	2 10	.....	17
.....	2 25	.....	1 50	.....	1 25	.....	1 06	.....	2 00	.....	18
.....	1 25	.....	1 00	.....	65 ..	.....	65 ..	.....	1 90	.....	19
.....	3 00	.....	3 50	.....	4 00	.....	4 75	.....	3 75	.....	20
.....	2 25	.....	2 25	.....	2 50	.....	2 50	.....	2 25	.....	21
.....	2 00	.....	1 75	.....	1 75	.....	1 00	.....	1 48	.....	22
.....	3 00	.....	3 50	.....	4 00	.....	4 75	.....	2 10	.....	23
.....	1 75	.....	2 25	.....	2 50	.....	2 50	.....	2 00	.....	24
1,800 00	33 ..	1,980 00	20 ..	1,200 00	43 ..	2,700 00	{ 15 } { 40 }	3,300 00	30 ..	1,800 00	25
.....	20 ..	.....	20 ..	.....	15 ..	.....	.....	.....	18 ..	.....	26
.....	15 ..	.....	15 ..	.....	25 ..	.....	10 ..	.....	15 ..	.....	27
.....	60 ..	.....	75 ..	.....	60 ..	.....	30 ..	.....	25 ..	.....	28
.....	8 ..	.....	7 ..	.....	10 ..	.....	10 ..	.....	8 ..	.....	29
12,000 00	50 00	12,500 00	55 00	13,750 00	{ 30 } { 10 }	10,000 00	{ 45 } { 25 }	16,250 00	55 00	13,750 00	30
.....	37 ..	.....	30 ..	.....	3 50	.....	65 ..	.....	35 ..	.....	31
.....	12 ..	.....	20 ..	.....	9 00	.....	65 ..	.....	25 ..	.....	32
1,500 00	25 00	1,250 00	35 00	1,750 00	28 00 8 50	1,850 00	{ 30 } { 22 }	2,600 00	25 00	1,250 00	33
.....	20 00	.....	25 00	.....	.....	.....	.....	.....	15 00	.....	34
.....	25 00	.....	35 00	.....	10 50	.....	15 00	.....	10 00	.....	35
.....	20 00	.....	25 00	.....	29 00	.....	30 00	.....	60 00	.....	36
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	37
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	38
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	39
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	40
.....	1 05	.....	1 00	.....	1 60	.....	.....	.....	1 25	.....	41
78,500 00	.....	79,780 00	.....	79,820 00	.....	84,980 00	.....	93,495 00	.....	81,760 00	

TENDERS AND EXTENSIONS, HAILEYBURY BRANCH

No.	Description.	Unit of Measurement.	Estimated quantity.	McQuigge & Hunt, Arnprior.		Can. Construction Co., Montreal.		A. R. Macdonnell, New Liskeud.		Wyse and Mitchell, Toronto.	
				Rate.	Amount.	Rate.	Amount.	Rate.	Amount.	Rate.	Amount.
1	Clearing.....	per acre	7	45 00	315 00	40 00	280 00	50 00	350 00	10 00	280 00
2	Grubbing.....	"		150 00		80 00		150 00		175 00	
3	Close-cutting.....	"		25 00		40 00		30 00		50 00	
4	Cross-logging.....	"		750 00		1,000 00		900 00		350 00	
5	Solid rock excavations.....	per cu. yd.		1 75		1 50		1 55		1 65	
6	Loose rock.....	"		65		60		45		75	
7	All other material.....	"	25,000	30	7,500 00	33	8,250 00	35	8,750 00	30	7,500 00
8	Solid rock in wet foundations.....	"		3 00		3 00		3 50		2 50	
9	Loose rock in wet foundations.....	"		2 00		1 00		1 75		1 25	
10	All other materials.....	"		1 00		50		1 75		60	
11	Masonry, 1st class.....	"		18 00		15 00		15 00		12 50	
12	Masonry, 2nd class.....	"		15 00		10 00		12 00		9 00	
13	Masonry, dry.....	"		5 00		6 00		6 00		6 00	
14	Concrete.....	"		11 00		11 00		12 00		8 00	
15	Concrete culvert pipe, 36 in. dia., in place.....	per lin. ft.		2 10		5 00		9 00		4 25	
16	" " " 30 in.	"		1 90		4 00		8 00		3 25	
17	Double strength vitrified culvert pipe 24 in. dia., in place.....	"		2 20		2 80		2 00		1 65	
18	" " " 18 in.	"		2 10		1 85		1 50		1 25	
19	" " " 12 in.	"		1 80		1 10		1 00		65	
20	Rip-rap, hand laid.....	per cu. yd.		3 75		2 50		3 50		4 00	
21	Rip-rap, loose laid.....	"		2 25		2 00		2 25		2 50	
22	Crib filling.....	"		2 25		2 00		1 75		1 75	
23	Paving.....	"		2 10		3 50		3 50		4 00	
24	Blind stone drains.....	per cu. yd.		2 50		2 00		2 25		2 50	
25	Piling driven under cap.....	per lin. ft.	3,600	32	1,152 00	38	1,368 00	20	720 00	45	1,620 00
26	" delivered.....	"		15		22		20		15	
27	Ties on right of way.....	per tie		20		15		15		25	
28	Telegraph poles on right of way.....	per pole		25		40		75		60	
29	Fence posts on right of way.....	per post		8		10		7		10	
30	Permanent trestles, timber built in, including iron.....	per ft. B.M.		5½		4½		5½		10 00	

TENDERS AND EXTENSIONS, HAILEYBURY BRANCH.—*Concluded.*

No.	Description.	Unit of Measurement.	Estimated quantity.	McQuigge & Hunt, Amprior.		Can. Construction Co., Montreal.		A. R. Macdonell, New Liskard.		Wyse and Middleton, Toronto.	
				Rate.	Amount.	Rate.	Amount.	Rate.	Amount.	Rate.	Amount.
31	Permanent trestle timber delivered	per ft. B.M.	.....	04 1/2	.....	37 00	.....	4 1/2	.....	28 00	.....
32	Temporary trestle, timber consisting of sills, caps, posts and stringers built in, including iron	per lin. ft.	.....	35	.....	35	.....	30	.....	3 50	.....
33	Temporary trestle timber, consisting of all classes of braces, built in, including iron ..	" "	.....	25	1,250 00	9	.....	20	.....	9 00	.....
34	Culverts, timber built in, including iron ..	per ft. B.M.	50,000 ft.	25 00	1,250 00	32 00	1,600 00	34 1/2	1,750 00	8 50	1,850 00
35	Culverts, timber delivered .....	" "	.....	1 1/2	.....	24 00	.....	21 1/2	.....	28 50	.....
36	Cribs, timber built in, including iron .....	" "	.....	10	.....	32 00	.....	3 1/2	.....	10 50	.....
37	Cribs timber delivered .....	" "	.....	6	.....	24 00	.....	2 1/2	.....	29 00	.....
38	Track laying	per mile	.....	.....	.....	.....	.....	.....	.....	.....	.....
39	Switches, including frogs	per turnout	.....	.....	.....	.....	.....	.....	.....	.....	.....
40	Ballasting, including surfacing	per cu. yd.	.....	.....	.....	.....	.....	.....	.....	.....	.....
41	Trestle filling by train .....	" "	.....	.....	.....	.....	.....	.....	.....	.....	.....
42	Fencing, including gates	per rod	850	1 25	1,062 50	1 00	850 00	1 00	850 00	1 60	1,380 00
Totals .....				.....	11,279 50	.....	12,348 00	.....	12,420 00	.....	12,610 00

TENDERS AND EXTENSIONS, CHARLTON BRANCH.

No.	DESCRIPTION.	UNIT OF MEASUREMENT.	Canadian Construction Co., Montreal.		R. B. Herron New Liskeard		A. R. Macdonald New Liskeard		Wyse & Middletonist.		McQuigge & Hunt, Amptor.	
			Rate.	Amount.	Rate.	Amount.	Rate.	Amount.	Rate.	Amount.	Rate.	Amount.
			% c.	% c.	% c.	% c.	% c.	% c.	% c.	% c.	% c.	% c.
1	Clearing.....	per acre	40 00	4000 00	40 00	4000 00	50 00	5,000 00	60 00	6,000 00	45 00	4,500 00
2	Grubbing.....	"	80 00	8000 00	150 00	1500 00	150 00	1500 00	200 00	2000 00	150 00	1500 00
3	Close-cutting.....	"	40 00	4000 00	40 00	4000 00	30 00	3000 00	50 00	5000 00	25 00	2500 00
4	Cross-logging.....	"	1,000 00	10,000 00	800 00	8000 00	900 00	9000 00	350 00	3500 00	750 00	7500 00
5	Solid Rock excavations.....	per cu. yd.	1 50	37,500 00	1 50	37,500 00	1 55	38,750 00	1 87	46,750 00	1 70	42,500 00
6	Loose Rock.....	"	60	6000 00	75	7500 00	45	4500 00	85	8500 00	65	6500 00
7	All other material.....	"	33	19,800 00	40	24,000 00	33	19,800 00	38	22,800 00	38	22,800 00
8	Solid Rock in wet foundations.....	"	3 00	3000 00	4 00	4000 00	3 50	3500 00	2 50	2500 00	3 00	3000 00
9	Loose Rock in wet foundations.....	"	1 00	1000 00	2 00	2000 00	1 75	1750 00	1 25	1250 00	2 00	2000 00
10	All other materials.....	"	50	5000 00	1 75	1750 00	1 75	1750 00	65	6500 00	1 00	1000 00
11	Masonry, 1st class.....	"	15 00	1500 00	18 00	1800 00	15 00	1500 00	12 50	1250 00	20 00	2000 00
12	Masonry, 2nd class.....	"	10 00	1000 00	12 00	1200 00	12 00	1200 00	9 00	900 00	16 50	1650 00
13	Masonry, Dry.....	"	6 00	600 00	6 00	600 00	6 00	600 00	6 00	600 00	6 50	650 00
14	Concrete.....	"	11 00	1100 00	11 00	1100 00	12 00	1200 00	8 75	875 00	11 00	1100 00
15	Concrete Culvert Pipe, 36 in. dia. in place.....	per lin. ft.	5 00	500 00	5 00	500 00	9 00	900 00	4 25	425 00	2 20	220 00
16	Concrete Culvert Pipe, 30 in. dia. in place.....	"	4 00	400 00	4 00	400 00	8 00	800 00	3 25	325 00	2 00	200 00
17	Double Strength Vitrified Culvert Pipe 24 in. dia. in place.....	"	2 80	280 00	2 50	250 00	2 00	200 00	1 65	165 00	2 20	220 00
18	" " 18 in. ".....	"	1 85	185 00	1 75	175 00	1 50	150 00	1 25	125 00	2 10	210 00
19	" " 12 in. ".....	"	1 10	110 00	1 25	125 00	1 00	100 00	65	6500 00	1 80	180 00
20	Rip-rap, hand laid.....	per cu. yd.	2 50	2500 00	3 50	3500 00	3 50	3500 00	4 00	4000 00	3 75	3750 00
21	Rip-rap, loose laid.....	"	2 00	2000 00	2 50	2500 00	2 25	2250 00	2 50	2500 00	2 50	2500 00
22	Gravel Filling.....	"	2 00	2000 00	2 00	2000 00	1 75	1750 00	1 75	1750 00	1 60	1600 00
23	Paving.....	"	3 50	3500 00	3 50	3500 00	3 50	3500 00	4 00	4000 00	2 10	2100 00
24	Blind Stone Drains.....	"	2 00	2000 00	2 00	2000 00	2 25	2250 00	3 00	3000 00	2 50	2500 00
25	Piling driven under cap.....	per lin. ft.	38	3800 00	30	3000 00	20	2000 00	50	5000 00	30	3000 00
26	" delivered.....	"	22	2200 00	12	1200 00	20	2000 00	15	1500 00	15	1500 00
27	Ties on right of way.....	per tie	15	1500 00	20	2000 00	15	1500 00	25	2500 00	15	1500 00

No.	Description.	Unit of Measurement.	Estimated quantity.	Canadian Construction Co., Montreal.		R. B. Herron, New Liskeard.		A. R. Macdonald, New Liskeard.		Wyse & Middledienst.		McQuigge & Hunt, Arnprior.	
				Rate.	Amount.	Rate.	Amount.	Rate.	Amount.	Rate.	Amount.	Rate.	Amount.
28	Telegraph poles on right of way	per pole		40		1 00		75		50		25	
29	Fence Posts on right of way	per post		10		08		07		10		08	
30	Permanent trestles, timber built in, including iron	per ft. B. M.	800,000	45 00	36,000 00	48 00	38,400 00	55 00	44,000 00	10 00	39,200 00	55 00	44,000 00
31	Permanent trestle, timber delivered	"		37 00		35 00		45 00				41	
32	Temporary trestle, timber consisting of sills, caps, posts and stringers built in, including iron	per lin. ft.		35		30 00		30 00		35 00		35 00	
33	Temporary trestle timber, consisting of all classes of braces, built in, including iron	"		09		18		20 00		9 00		25 00	
34	Culverts, timber built in, including iron	per ft. B. M.	250,000	32 00	8,000 00	25 00	6,250 00	35 00	8,750 00	8 50	9,250 00	25 00	6,250 00
35	Culvert timber delivered	"		24 00		20 00		25 00		28 50		1 1/2	
36	Cribbs, timber built in, including iron	"		32 00		40 00		35 00		10 50		10 00	
37	Cribbs, timber delivered	"		24 00		30 00		25 00		29 00		16 00	
38	Track laying	per mile											
39	Switches, including frogs	per turnout											
40	Ballasting, including surfacing	per cu. yd.											
41	Trestle filling by train	"	5,120	1 00	5,120 00	1 10	5,632 00	1 00	5,120 00	1 70	8,704 00	1 25	6,400 00
42	Fencing, including gates	per rod											
	Total				110,420 00		115,782 00		121,420 00		132,704 00		126,450 00

REPORT COVERING MINING RIGHTS FOR THE YEAR 1906.

The building of the Temiskaming and Northern Ontario Railway opened up the heart of the mineral belt.

In 1905 the Commission carried on some prospecting on the town site of Cobalt, and the result of the work in this direction bore out the belief as to the existence of mineral in this area. Subsequently the mining rights on what was known as the Southwest thirty-seven acres of the townsite of Cobalt were leased to a syndicate, the members of which had filed claims of discovery of mineral on the property in question, and the interested parties having, at the suggestion of the Commission, adjusted their interests relative thereto, it enabled an early consummation of the lease to the Cobalt Townsite Mining Company, the Commission receiving the sum of \$35,000.00 as a bonus, the lease also providing for payment of royalty on all ore mined of 25 per cent. on ores up to \$1,000 per ton value, and 50 per cent. on ores over \$1,000 per ton.

Several claims of discovery of mineral were filed in connection with what was known as the Northwest forty acres, and the Commission suggested the same procedure to the interested parties as was followed in connection with the Southwest thirty-seven acres, but no agreement was reached by the claimants, and the mining rights in this area were duly offered for public tender and subsequently leased to the Wright Silver Mining Company, the Commission receiving as bonus the sum of \$22,000.00, the lease also providing for payment of royalty on all ore mined of 15 per cent. on ore up to \$400, 25 per cent. on ores up to \$1,000 per ton value, and 50 per cent. on ores over \$1,000 per ton.

The mineral rights upon lots numbers 390 to 393, 453 to 456, and 467 to 470, were leased to the Nancy-Helen Mines, Limited, the amount of bonus paid being \$6,000.00, the lease in conformity with the others also containing provisos for the payment of royalty of 25 per cent. on ores of less than \$1,000 per ton in value, and 50 per cent. on ores over \$1,000 per ton value.

The Commission also offered the mining rights on the right-of-way of the railway between mileages 101 and 105 for public tender, after cancellation of lease entered into with the Ottawa Syndicate, the Government, upon consideration of all the facts, suggesting re-advertisement and calling for new tenders, resulting in the leasing of the area in question to T. A. Beament and J. P. Dickson, of Ottawa, the cash bonus paid being \$50,000, the lease also containing the clauses for payment of royalty of 25 per cent. on all ores mined. Later the Commission consented to the transfer of this lease to the Right-of-Way Mining Company, Limited.

The Commission also decided, near the end of the year, to offer for public tender the mining rights on the following portions of the right of way, *i. e.*, between mileages 90 and 95, 95 and 101, and 105 and 108. Offers were duly received, resulting in the leasing of the parcels in question to T. A. Beament, of Ottawa, and W. N. Ferguson, of Toronto (said lease being afterwards assigned to the Railway Reserve Mines, Limited, the Commission consenting thereto). The bonus paid in this instance was \$38,100.00, and payment of royalty was also duly provided for of 25 per cent. on all ores mined.

Incorporated in this report is a copy of the usual form of lease entered into in connection with mining rights, etc., and the following statement shows the various parcels leased to whom, amount of cash bonus received and the royalty percentage payable to the Commission relative to each lease, viz.:

MEMORANDUM *re* MINING LEASES.

Date of Lease, 1906.	Name.	Consideration.	Lands Leased.	Percentages.
May 16	Cobalt Townsite Min'g Co. John MacKay, Pres., A. J. Young, Sec.-Treas.	\$35,000 00	Lot No. 45 on plan 47 recorded in Land Titles Office, North Bay.	25% of value of ore assaying \$1,000 per ton or less. 50% on ore assaying over \$1,000 per ton.
Sept. 12	T. A. Beament and John P. Dickson. Assigned by them to Right-of-Way Mining Co., Ltd., Sept. 15, '06.	50,000 00	On certain parcels between M. 101 and 105 on right-of-way, T. & N. O. Ry.	25% of value of all ore.
Oct. 1	The Wright Silver Mng. Co., Ltd., Fred. C. Elks, Dir'r, C. Chas. Robertson, Dir. & Sec.	22,000 00	Lot 43 on plan M. 47 recorded in Land Titles Office, at North Bay.	15% of value of ore assaying \$400 per ton or less. 25% assaying over \$400 and up to \$1,000 per ton. 50% assaying over \$1,000 per ton.
Nov. 1	Nancy - Helen Mines, Ltd., W. R. Smyth, Pres., J. F. Black, Sec.-Treas.	6,000 00	Lots 390, 391, 392, 393, 453, 454, 455, 456, 467, 468, 469 and 470.	25% of value of ore assaying less than \$1,000 per ton 50% assaying \$1,000 per ton and upwards.
Dec. 27	W. N. Ferguson and T. A. Beament.	5,000 00	Between M. 90 and 95, right-of-way, T. & N. O. Ry.	25% of value of all ore.
Dec. 27	do	30,100 00	Between M. 95 and 101, right-of-way, T. & N. O. Ry.	do
Dec. 27	do	3,000 00	Between M. 105 and 108, right-of-way, T. & N. O. Ry.	do

REPORT COVERING TOWNSITES FOR THE YEAR 1906.

Reference was made in the last Annual Report to the sale of lots in the various townsites, and the following statement shows the number of lots sold in the townsites, which have been subdivided, value thereof amount paid, and the balance due, viz:—

	Lots Sold.	Amount Paid.	Balance Due.
Temagami	51	\$ 2,400 00	
Latchford	194	14,203 00	\$ 150 00
Cobalt	172	77,133 10	390 00
Englehart	108	9,082 50	13,927 50
Totals.....	425	\$102,818 60	\$14,467 50

STATEMENT OF RECEIPTS AND EXPENDITURES ON ACCOUNT OF TOWNSITES AND MINING RIGHTS
FOR THE YEAR ENDING DECEMBER 31ST, 1906.

Debit.

Lots sold Townsites.....	117,286 10	
Miscellaneous amounts collected.....	166 61	
		117,452 11
Interest on Deferred Payments.....		227 20
Interest on Deposit Receipts.....		149 20
Deposits on Individual Lots.....		600 00

Mining Bonuses:—

Cobalt Townsite Mining Co.....	35,000 00	
Right of Way Mining Co., Limited.....	50,000 00	
Wright Silver Mining Co., Limited.....	22,000 00	
Nancy Helen Mines, Limited.....	6,000 00	
Railway Reserve Mines Limited.....	38,100 00	151,100 00
		269,528 51

Loss:—

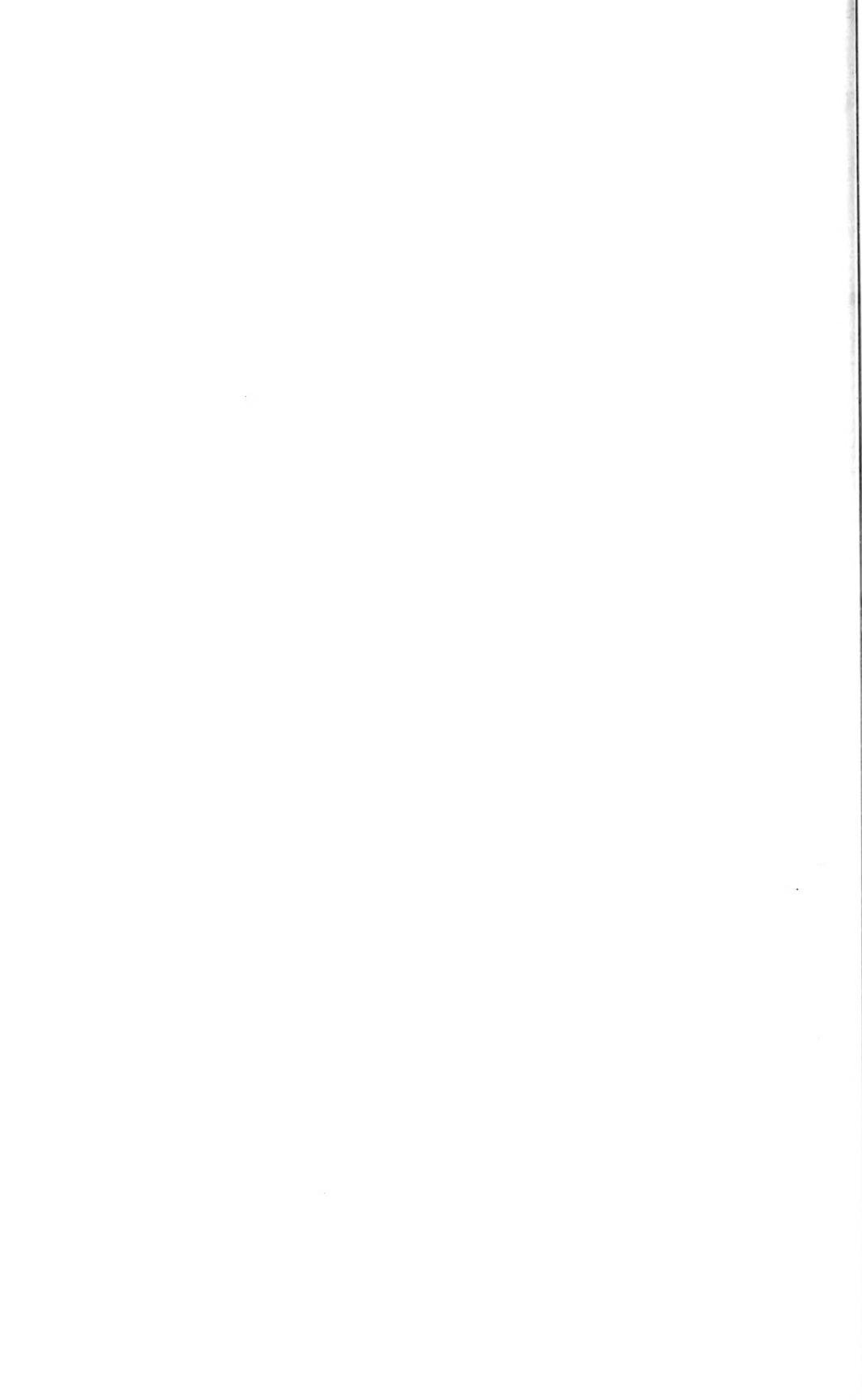
Deferred Payments Mining Rights.....	16,000 00	
Deferred Payments, Townsites.....	14,467 50	30,467 50
		239,061 01
Expenses plotting and prospecting Townsites and expenses re Mining Rights.....		31,525 32
		207,535 69

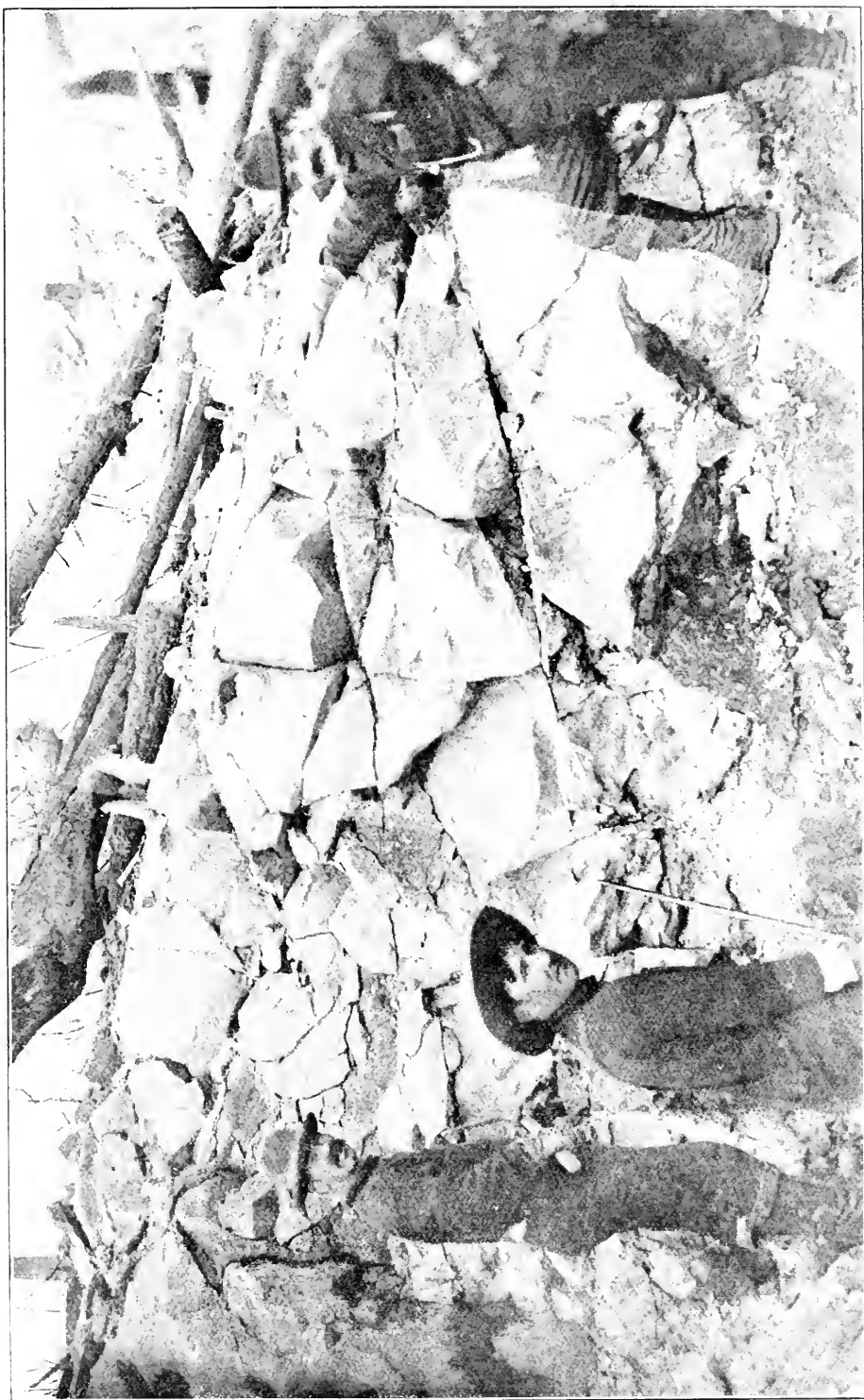
Credit.

Applied on cost of Road.....	123,674 60	
Accountable for by Operation	83,725 09	
		207,399 69
Cash in Bank December 31st, 1906.....		136 00
		207,535 69



Making a Portage on the way to Larder Lake.





Mining in Bucke Township.

STATEMENT No. 1.

Showing Expenditure on 1st Division between North Bay and New Liskeard
during 1906.

STATEMENT No. 1.—Showing Expenditure on 1st Division between North Bay and New Liskeard during 1906.

Item.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
Engineering Expenses.....	175 14	736 60	615 82	296 23	38 00	261 31	287 52	275 63	680 27	610 09	100 35	453 21	4,669 17
Location.....										137 41	127 51	7 00	271 92
Right of Way and Station Grounds.....	26,477 30	5,611 15	3,018 80	1,237 87	1,237 87	1,237 16	1,015 30	6,374 50	1,098 58	1,939 57	430 22	816 04	49,916 04
Clearing.....		826 68	9 22	3,629 71	3,629 71	1,252 26	7,145 99	826 98	174 38	1,066 27	73 90	6 05	10,849 61
Grubbing.....	12,446 30	67,747 52	2,113 56	693 36	337 59	11,949 91	4,870 01	2,666 82	289 11	7,254 57	8,298 72	581 34	139,197 47
Excavating.....	671,725 30	109 95	3,840 60	1,432 19	1,432 19	736 49	48 86	4,403 93	13,317 71	5,289 86	405 53	117 34	31,626 81
Drains, Prestles and Culverts.....	827 80	2,817 61	707 19	1,482 60	1,482 60	1,065 37	270 00	10 80	ct.	16 15	29 99	22 14	12,983 48
Rails.....	1,072 61	21 40	6 32	ct.	13,076 77	12 94	1,232 00	10 80	ct.	16 15	29 99	22 14	3,486 17
Track Fastenings.....	102 00	245 16		ct.	682 35	105 37	703 39		900 55	180 00	33 30	612 00	2,051 24
Track Laying and Surfacing.....				112 80		317 78	2,303 74	1,841 59	ct.	897 35	380 25	1 29	3,837 29
Ballast and Gravel.....	2 50			196 75	3,420 72			113 12	739 61				854 05
Fencing Right of Way.....	406 57	106 97	21 50	66 65	127 60	267 22	389 40	416 71	792 88	1,319 71	162 30	60 05	4,140 32
Crossings, Cattle Guards and Signs.....	11,149 90	4,522 19	9,658 89	3,200 66	5,357 07	3,389 18	132 61	968 71	1,223 25	4,972 24	5,726 03	7,996 51	61,337 80
Stations.....	793 03	3,161 28	4,433 20	8,499 68	7,100 91	5,178 61	6,557 51	4,465 43	8,312 91	5,770 67	4,798 15	3,130 26	64,251 64
Buildings and Fixtures.....	8 98	191 94	4 45	55 50	369 33	59 41	2,146 16	1,951 65	2,611 30	4,334 40	21 76	59 38	14,857 88
Engines, Houses and Turntables.....	836 91	537 70	217 47	196 42	74 20	458 30	95 29	100 29			151 46	218 65	2,969 69
Engine and Car Shops.....	620 81	4,818 47	282 60	1,785 56	17 75	53 65				26 89	37 62		7,642 75
Shop Material and Tools.....	497 07	1,280 38	208 03	1,138 34	640 99	759 62	632 05	670 76	1,155 88	1,845 70	412 56	764 41	10,038 74
Water Stations.....	389 95	561 06	38 18	68 47	208 05	118 13	2,083 36	2,959 75	2,497 64	4,073 87	1,655 50	977 95	16,097 97
Fuel Stations.....	190 80	338 17	119 55	220 90	313 25	280 36	229 34	123 21	934 55	251 53	45 43	106 51	3,163 60
Section and Tool Houses.....	58 75	522 44	211 90	13 50	341 82	232 51	508 73	55 25	33 02		291 11	21 00	2,295 03
Miscellaneous structures.....	987 11	1,250 47	3,000 03	2,417 84	4,023 55	4,095 25	4,551 56	128 23	605 58	72 47	402 02	388 16	20,711 11
Telephone.....	5,386 80	3,540 82	3,340 35	66 85	2,989 44	446 13	52 85	23 63	85 00	293 85	225 00		16,250 72
Construction Equipment.....	115 36	1 20	46 90	3,196 71	123 65	139 49	70 70	23 90	1 50	7 00	7 40		3,728 16
Section Equipment.....	109 22	251 23	566 64	577 03	147 10	12 94	33 82	29 89	74 44	2 00	1 64		1,813 95
Interest and Discount.....				25	100 00	100 00	529 52	100 00	253 70	100 00	10 60	ct.	12 73
Legal Expenses.....	366 67	1,194 38	957 77	100 00	100 00	621 84	445 44	128 96	945 05	44 01	651 25	865 29	4,158 75
General Expenses.....	308 91	322 05	744 77	488 29	316 01			36 75					5,971 90
Electric Light Plant.....	131 27	681 65					58 24	260 04	357 68	241 85	255 86	87 97	1,819 67
Branch Lines.....				1,380 43	1,389 06	265 81	22 10						1,264 64
Electric Traction.....	398 06	306 43	231 76	592 57	372 48	465 63	246 39	35 25	97 65	96 94	101 65	80 16	4,003 65
Boarding Car Equipment.....													2,088 72
Total.....	66,910 27	15,729 66	33,113 22	34,912 18	48,110 61	32,866 82	30,301 81	33,991 78	126,511 24	41,287 71	25,930 82	18,268 42	507,967 57

STATEMENT No. 2.

Showing Expenditure on account of extension Northerly from New Liskeard
during 1906.

GENERAL BALANCE SHEET.

Capital Accounts.

Liabilities.

Loan from Province of Ontario.....	9,248,454 80
Accounts Payable, Miscellaneous.....	208,770 58
Unclaimed Wages.....	456 65
Deposits on Contracts.....	7,500 00

9,465,182 03

Assets.

Cost of Road and Equipment to December 31st, 1905.....	7,426,805 84
Cost of Road, 1st Division, for 1906.....	507,967 57
Cost of Road, 2nd Division, for 1906.....	1,148,842 34
Cost of Equipment for 1906.....	333,620 56
Discount Stamps and underwriting London Loan.....	232,666 66

9,649,902 97

Less net proceeds from sale of Townsites and Mining Rights applied on cost of road.....	123,674 60
Less amount of proceeds from Operation applied by the Treasurer of Ontario on Original Loan.....	100,000 00 223,674 69

9,426,228 37

Expended on James Bay Exploration.....	4,357 83
Chief Engineer, Advance.....	6,000 00
Accounts Collectible, Miscellaneous.....	11,864 82
Accounts Collectible, Operation.....	9,131 14
Stock Material on hand December 31st, 1906.....	7,447 06
Cash in Metropolitan Bank December 31st, 1906.....	152 81

9,465,182 03

GENERAL BALANCE SHEET REVENUE ACCOUNTS YEAR ENDING DECEMBER 31ST, 1906.

Liabilities.

Accounts Payable (includes December Payrolls).....	90,227 50
Car Mileage Balance.....	1,570 80
Foreign Ticket Balance.....	4,166 53
Foreign Freight Balance.....	4,126 36
Mining Bonuses.....	83,725 09
Townsites Accounts Payable.....	165 40
Profit and Loss.....	37,319 85

221,301 53

Assets.

Agents Conductors Balance.....	25,847 32
Accounts Collectible.....	133,668 64
Cash in Bank.....	25,706 43
Fuel and Supplies on hand.....	35,029 14
Superintendent's Advance.....	1,000 00
Treasurer's Petty Cash.....	50 00

221,301 53

PROFIT AND LOSS ACCOUNT YEAR ENDING DECEMBER 31ST, 1906.

Credits.

Balance Carried Forward.....	13,948 05
Net Revenue as of December 31st, 1906.....	181,526 27

195,474 32

Debits.

Proceeds from Operation paid Treasurer of Ontario.....	158,154 47
Balance Carried Forward.....	37,319 85

195,474 32

STATEMENT OF EARNINGS AND EXPENSES, 1905-1906.

Particulars.	1906.	1905.	Increase.
<i>Receipts.</i>	\$ c.	\$ c.	\$ c.
Passenger	254,759 33	108,681 76	146,077 57
Mails and Express	17,596 35	7,804 85	9,791 50
Freight	230,552 63	121,530 46	109,022 17
Telegraph and Telephone	20,514 53	4,697 07	15,817 46
Miscellaneous Receipts	20,596 01	11,006 41	9,589 60
Total	544,018 85	253,720 55	290,298 30
<i>Expenditure.</i>			
Maintenance of Way and Structures	77,265 87	25,072 89	52,192 98
Equipment	46,382 65	12,533 68	33,848 97
Conducting Transportation	215,256 08	88,342 41	126,913 67
General Expenses	23,194 61	13,823 52	9,371 09
Taxes	393 37		393 37
Total	362,492 58	139,772 50	222,720 08
Operating Expense to Earnings, Percentage.....	66%	55%	11%

DETAILS OF OPERATING EXPENSES.

<i>Maintenance of Way and Structures.</i>	1906.	1905.
	\$ c.	\$ c.
Repairs of Roadway	52,541 47	20,367 75
Superintendence	2,892 06	629 15
Ballast and Ballasting	4,196 15	46 65
Clearing Snow	6,134 43	3,083 43
Renewal of Ties	90 01	
Repairs and Renewals of Bridges and Culverts	5,507 71	82 91
Repairs and Renewals of Fences, Road Crossings, Signs and Cattle Guards	434 16	348 71
Repairs and Renewals of Buildings and Fixtures	2,090 04	217 89
Repairs and Renewals of Telegraph	3,120 45	295 67
Stationery and Printing	188 40	75
Other Expenses	70 99	
<i>Maintenance of Equipment.</i>		
Superintendence	4,628 34	1,295 28
Repairs and Renewals of Locomotives	19,517 14	7,923 19
Repairs and Renewals of Passenger Cars	8,193 32	1,226 30
Repairs and Renewals of Freight Cars	6,547 33	1,342 88
Repairs and Renewals of Work Cars	2,059 63	490 39
Repairs and Renewals Shop Machinery and Tools	1,944 61	39 99
Stationery and Printing	359 49	87 27
Other Expenses	3,132 79	128 38

DETAILS OF OPERATING EXPENSES—Continued.

Conducting Transportation.	1906.	1905.
	\$ c.	\$ c.
Superintendence.....	9,222 32	3,775 58
Engineers and Firemen, Passenger.....	6,716 29	3,263 72
Engineers and Firemen, Freight.....	10,245 09	5,276 95
Roundhouse Men.....	3,515 88	631 32
Fuel for Locomotives.....	74,666 16	34,642 14
Water Supply for Locomotives.....	5,524 05	2,004 70
Oil, Tallow and Waste for Locomotives.....	1,672 55	942 94
Other Supplies for Locomotives.....	608 22	312 78
Train Service, Passenger.....	8,845 46	4,053 32
Train Service, Freight.....	14,083 16	6,587 19
Train Supplies and Expenses.....	6,490 45	2,216 93
Switchmen, Flagmen and Watchmen.....	697 10	164 00
Telegraph Expenses.....	7,234 77	5,093 36
Station Service.....	16,686 54	4,272 95
Station Supplies.....	4,264 31	1,175 74
Switching Charges Balance.....	10,889 50	5,056 89
Car Mileage Balance.....	13,202 66	5,273 24
Hire of Equipment.....	516 18	235 80
Loss and Damage.....	1,417 14	337 45
Injuries to Persons.....	428 59	1 00
Clearing Wrecks.....	1,367 23	287 53
Advertising.....	4,514 88	54 23
Rents for Tracks, Yards and Terminals.....	2,402 60	1,593 99
Rent of Buildings and other property.....	772 00	.....
Stationery and Printing.....	6,204 21	1,088 66
Other Expenses.....	3,068 74	.....
General Expenses.		
Salaries of General Officers.....	5,665 86	4,969 03
Salaries of Clerks and Attendants.....	6,796 86	2,984 46
General Office Expense and Supplies.....	2,731 83	1,301 41
Insurance.....	4,764 92	3,273 78
Law Expenses.....	1,153 98	900 79
Stationery and Printing General Offices.....	1,382 92	275 05
Other Expenses.....	581 30	50 00
Guarantee Premiums.....	116 94	69 00
Taxes.....	393 37	.....
Total.....	362,492 58	139,772 50

TRAIN FREIGHT AND PASSENGER STATISTICS, YEAR 1906.

Train Mileage.	1906	1905
Passenger Trains.....	114,982	45,538
Freight Trains.....	126,378	21,080
Mixed Trains.....	4,203	52,197
Total.....	245,563	118,815

TRAIN, FREIGHT AND PASSENGER STATISTICS, 1906—*Continued.*

Car Mileage.	1906	1905
Passenger Cars.....	629,218	258,715
Freight Cars.....	1,814,688	873,689
. Total.....	2,443,906	1,132,404

Passenger Traffic.	1906	1905
Passengers carried.....	359,861	86,648
do. do. one mile.....	10,365,311	4,765,106
Average distance travelled by passengers, miles.....	29	55
Average amount received from each passenger.....	.71	1.25
Average amount received per passenger per mile, cents.....	2.36	2.30

Freight Traffic.	1906	1905
Tons of freight carried.....	273,749	99,192
Tons of freight carried one mile.....	15,233,761	6,624,019
Average haul freight (miles).....	55	67
Average amount received for each ton freight, cents.....	84	1.22
Average amount received per mile for each ton freight, cents.....	.015	.018

CLASSIFIED STATEMENT OF TONNAGE, YEAR 1906.

Commodity.	Tons.	Commodity.	Tons.
Merchandise.....	11,495	Brick Cement.....	4,245
Grain.....	3,937	Stone.....	88
Flour (20 576 bbls.).....	2,016	Silver Ore.....	5,660
Mill Feed.....	449	Other Ore.....	126
Lumber.....	29,609	Butter and Cheese.....	732
Logs (23,571,500 ft.).....	109,137	Manufactured Goods.....	10,949
Bark.....	481	Emigrants Moveable Stock.....	1,395
Timber Wood.....	7,008	Iron and Steel.....	815
Pulp Wood (1,320 cords).....	3,174	Household Goods and Furniture.....	581
Live Stock.....	2,809	All Others.....	41,837
Pork.....	378		
Hay.....	5,422		
Coal.....	31,426		273,749

REPORT OF GEORGE A. McCARTHY, CHIEF ENGINEER, THE
TEMISKAMING AND NORTHERN RAILWAY
FOR THE YEAR 1906.

I beg to submit herewith my Annual Report for the year ending December 31st, 1906. A few remarks regarding the general condition of labor, the difficulties of procuring material, etc., will be in order.

The question of sufficient labor has caused us a great deal of trouble and expense. The contractors have never had the quantity nor quality of men which were really necessary to satisfactorily carry on the works. The gangs working for the railway were continually losing their best men, who, in many instances, found work in Cobalt mines at rates of pay far in excess of those our work would stand. A gang of men taking out rock at Cobalt came particularly under my notice. Every evening the best drillers were hired by some of the mine foreman and the gang had to be continually supplemented from North Bay. It is an ordinary occurrence for men hired in the large centres and advanced their railway fare to the site of the work, to leave after getting a meal and night's lodging. Under the law, as it stands at present, the only redress a contractor or employer has against these men is to bring a civil action, which, of course, is useless.

During the season of 1905 the rate of ordinary labor on contract work was 15 cents per hour. $17\frac{1}{2}$ cents per hour was the lowest rate paid during the year just closed, and in many cases 20 and 25 cents per hour was paid. When it is remembered that the laborers available at these rates are of a class not of the best, it can readily be understood that the cost of all classes of construction in the northern part of Ontario is greatly in excess of the same work at points where men, skilled each in his particular line, can be obtained.

Lumber of all kinds has been in great demand the country over. None of the mills that received orders from us lived up to their agreements as to time of delivery. The movement of lumber to and from this country is most peculiar. Logs are shipped from Diver, a point on our line forty miles from North Bay, to Sarnia, thence to Ottawa and other distant points in Ontario, and from several points between North Bay and Diver to Callander. There is a large saw-mill at Latchford, yet building materials of all kinds come to Cobalt from points as far south as Toronto, and the contractor on the second division was compelled to get much of his trestle timber from British Columbia.

None of the smaller contractors were able to complete their contracts within the stipulated time, largely on account of being unable to get labor or materials. At New Liskeard the contractor for the High School was completely tied up for six weeks on account of being absolutely unable to get plasterers. The foregoing will give some slight idea of the difficulty every person who carried on building operations in Northern Ontario has experienced during the year 1906.

The upper part of the first division between New Liskeard and Englehart is included in the second contract with A. R. Macdonnell. The contractor had failed to live up to his obligation to have his part completed by December 31st, 1904. In October last, under an agreement with the contractor, a regular train service was put upon this part of the line. From that date all trains, both in the railway service and the construction trains of the contractor, were under the guidance of the railway despatchers at North Bay. During the progress of trestle filling along this section clay land slides, con-

tinually gave trouble. At mile 115½ there was built across a small ravine a pile trestle. The Wabis River runs parallel to our track at a distance of about 300 feet on the west. When an attempt was made some two years ago to fill this ravine by teams and scrapers a slide took place and in an effort to prevent a recurrence a row of 40 feet piles was driven about 100 feet from the centre of the track towards the river. At the same time the temporary pile trestle previously referred to was constructed. In November last, when this trestle was about filled, the whole country between the track and the river moved westward, completely filling the stream. Any attempt to fill the trestle caused a recurrence of this slide, so a temporary track was constructed around the opening for the winter.

At mile 118½ sliding clay banks caused the collapse of a 10 foot concrete arch culvert on pile foundations. A temporary pile trestle was built across the opening. At mile 119¼, when filling the temporary trestle, the ground immediately under the bank sank suddenly and the ground on either side rose up. The ends of the 30 inch concrete pipe culvert at this point were thus left standing about vertical.

Notwithstanding the interruptions to traffic caused by the slides referred to, a regular train service was maintained. It was necessary in some cases to transfer passengers and baggage, but all such operations were conducted without accident and with as little inconvenience to the public as possible.

The Construction Department has done everything possible to gain and keep the good will of the reasonable people with whom its members came in contact. An earnest effort was made during the year to get the long delayed claims on account of right of way amicably adjusted. In many cases such efforts have been successful. The arbitration of the claims of those residents in the neighborhood of New Liskeard, who had claims of some two and a half years' standing, had just been concluded to the satisfaction of all parties concerned.

The soft condition of the roads through the clay belt during the spring and fall rains makes transportation from the railway to the towns and villages very difficult. To assist residents in every legitimate way and to encourage them to help themselves has always been the aim of this department. With the consent of the Commission road gravel was distributed by train to the following points and used by the town and municipalities in improving the clay roads: Haileybury, New Liskeard, Earleton. During the season one hundred cars of gravel were thus distributed.

MAIN LINE ROADBED.

First Division.

A. R. Macdonnell Contract. The filling of the trestles at miles 68 and 88¾ was completed by the contractors in the early spring and their entire plant was then moved to the second division. Considerable cleaning up of ballast pits was necessary after the contractors left the work. This work was done by the employees of the Commission and the cost charged to the contractor. A final estimate for the first contract was given the contractor in September, 1906.

Construction by Employees of Commission.

In addition to the work done by contract, a large amount of work chargeable to construction was performed by our own forces.

Widening Banks. In this connection many banks which, on account of the scarcity of material for borrow, had been left narrow by the contractors, were widened. The material, amounting to 26,263 cubic yards, was excavated by steam shovel and placed by work train.

Filling Bridges. The pile bridge at mile 47½ was continually getting out of line and service, so a 4 ft. x 4 ft. cedar box culvert was built under it and the bridge filled by steam shovel and work train. The quantity of material used being 2,280 cubic yards.

At mile 99 the pile bridge across Mud Lake was filled with the exception of 14 ft. opening on which was placed a permanent ballasted deck. Filling the bridge required 680 cubic yards of material.

At mile 88¾, the contractors having filled this bridge during the winter season, the spring weather caused a slide and settlement, which was filled by us, using 4,112 cubic yards of material. A culvert 2½ ft. x 2½ ft. was provided at the same time.

On account of the settlement of muskegs the settling of ballast in the rock dumps and the settlement of material where trestles had been filled by the contractors, a great deal of picking up was required chargeable to maintenance. This made the cost of track maintenance particularly heavy this past year. The quantity required for filling in the different cases was 10,256 cubic yards for ballasting, 6,072 cubic yards for lifting muskegs, 3,693 cubic yards for refilling trestles. The greater part of the ballast referred to was from the Redwater Pit and was placed between Mulock and Widdifield to cover the light sand ballast in this neighborhood and thus keep down the dust which had proved very objectionable.

In only one case during the year was the track broken, causing passengers to transfer. This was caused by a slide taking place when the temporary trestle was refilled at mile 68½. On the 30th of June, just after the track had been lifted to grade, a slide took place near the north end of this bank. The break was quickly filled with timber and ballast and has never since given us any trouble. The quantity of material required to fill the hole was 1,485 cubic yards, which is included above under the heading "Filling Trestle."

At mile 52 a sink hole has been developing for the past year. The muskeg in this region was known to be soft, so originally the bank was made as light as possible. The weakest spot is just south of the 52nd mile. It was heavily cross-laid and has been lifted a number of times. It is still holding the track safely. Sink holes developed while the contractor was ballasting, one on either side of the 52nd mile. A good bottom was finally reached and no trouble has been experienced during the past year.

Track Work. Owing to the increased speed of passenger trains during the summer service it was found necessary to increase the elevation of our curves to about $\frac{3}{4}$ inch per degree.

Rail braces and tie plates have now been placed and all curves of four degrees and over. On all curves below four degrees and over two degrees tie plates have been placed to give additional security to the track.

Broken Rails. Only two rails were broken in the track during the year. Both were traceable to old flaws. In one case it was caused by a piece of rock falling from the rock cutting while prospectors were blasting. In the other case the cause of the flaw could not be determined.

Ties. Under our contract for the second division with A. R. Macdonnell we were obliged to load all ties which were shipped from this division and used on the second contract. A work train was employed and 227 cars, containing 67,969 ties, were forwarded northward.

The following ties were used during the year in main line and crossing sidings:

Laid in main line	2,612
Renewed in main line	504
Laid in crossing sidings	181
Renewed in crossing sidings	100

A total of ties	3,397
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A contract has been entered into with John Cahill, of Bonfield, Ont., for the supplying of 275,000 ties. This quantity is required to lay the track on the proposed extension from the end of Macdonnell's second contract to the Transcontinental Junction; to lay track on the Charlton, Kerr Lake and Haileybury branches and for general purposes.

Clay Cuttings. The clay which ran down the slopes of the cuttings between Haileybury and New Liskeard was removed from the ditches by work train. About 1,200 cubic yards of material was thus taken out and placed on embankments.

Rip Rapping. Three hundred and thirty-two cars of stone for rip rapping embankments, which were exposed to the wash from the waters of the different lakes, were loaded by work train and placed where required.

Rock Cuttings Widened. Some work was necessary in connection with the widening of rock cuttings to give clearance for properly running wing plows. 1,170 cubic yards of rock was removed for this purpose.

Clearing. To properly protect the telegraph line the land outside our right of way limit has been cleared for a distance of about 30 ft. Where settlers were on the land we were sometimes able to let contracts, but in most instances we were compelled to do this work with our own men. All logs were saved. Those between Temagami and Latchford were sold to A. McPherson and Co., and taken to the mill at Latchford. The logs cut on timber limits or across farms became the property of the timber operator or the farmer respectively. This clearing has now been completed between North Bay and Englehart.

At Latchford all streets of the townsite north and south of the river were cleared and the brush burned.

The park on the point at this place was underbrushed and now presents a very creditable appearance.

At Englehart, under a contract with J. C. Campbell, about thirty acres of clearing was done on the streets.

It was necessary to employ extra gangs to cut the bushes which had grown along the right of way since the original clearing was completed by the contractor. This was chargeable to maintenance and is another of the unusual charges making the operating expenses particularly heavy during this year. We were unable to complete this work and it will be continued next season.

Under Drains. In many of the wet clay cuttings from Cobalt north it was necessary, to keep the track from heaving, to lay farm tile below the surface. The quantity mentioned was put in at the following points:

Mile 11½	600	feet of 6 inch land tiles.
" 103½	900	" "
" 103¾	900	" "
" 106	1,000	" "
" 110½	1,600	" "
" 113	400	" "

A total of	5,400	"	"
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Road Crossings. At mile 112 $\frac{3}{4}$ a main road crossing was fenced and cattle guards put in for main line and siding. Private road crossings were established at the following points:

Mile 3 $\frac{3}{4}$.
 Mile 101 $\frac{1}{2}$.
 Mile 109.

Rail Racks. Forty rail racks of the "A" pattern were put up between North Bay Junction and New Liskeard. These are used for the keeping of emergency rails, each rack holding three. These are placed from 2 $\frac{1}{2}$ to 3 miles apart, according to the circumstances and conditions.

Bridges.

Mile 11 $\frac{1}{4}$: At this point the steel span has been put in position and a proper timber floor and guard rails provided. Span 40 ft. in length.

Mile 34: The pile bridge here is 183 ft. long. Two openings of 14 ft. each have been walled up with cedar to provide for water passage and the remaining structure may be filled in 1907.

Mile 47 $\frac{1}{2}$: The pile bridge 86 ft. long has been filled with gravel and a cedar box culvert 4 ft. x 4 ft. provided.

Mile 99 $\frac{1}{2}$: The pile bridge 71 $\frac{1}{2}$ ft. long has been filled with gravel and an opening 14 ft. long has been provided, on which was placed a permanent ballast deck.

Mile 118 $\frac{1}{2}$: Pile and bent bridge 86 ft. long built at the site of arch culvert with pile foundation. This arch was broken by sliding clay banks when train filling was being placed over culvert. This backed up the water in the stream which eventually washed a hole through the embankment.

Open Culverts.

At the following points timber decks were removed and the culverts provided with permanent concrete steel tops carrying a ballasted track:

Mile.	Clear Opening.	Mile.	Clear Opening.
	feet. inches		feet. inches.
11 $\frac{1}{2}$	13	18 $\frac{5}{8}$	13
4 $\frac{1}{2}$	14 6	18 $\frac{1}{2}$	13
17 $\frac{1}{2}$	12	43 $\frac{1}{2}$	13
17 $\frac{1}{2}$	12	45 $\frac{1}{2}$	12
18	13 6	60 $\frac{1}{2}$	8
73 $\frac{1}{2}$	14 6	70 $\frac{1}{2}$	12
78 $\frac{3}{4}$	13	80 $\frac{1}{2}$	13 6
78 $\frac{3}{4}$	13 6	97 $\frac{1}{4}$	14
79 $\frac{3}{4}$	14	99	14

Box and Pipe Culverts.

The following culverts were built during the year to provide proper drainage for the roadbed:

Location.	Size.				Length.	Description.
	Feet.	Inches.	Feet.	Inches.		
North Bay Junction.....	2	6	x	2	6	34 Cedar box.
North Bay Junction.....	12					24 Vitrified pipe.
North Bay Junction.....	2	6	x	2	6	24 Cedar box.
North Bay Junction.....	12					24 Vitrified pipe.
Mile 31.....	2		x	2		20 Cedar box.
Mile 31.....	2	6	x	2	6	20 "
Mile 81.....	3		x	3		40 "
Mile 121.....	3		x	3		45 "
Mile 171.....	3		x	3		25 "
Mile 271.....	2	6	x	2	6	34 "
Mile 34.....	2	6	x	2	6	34 "
Mile 391.....	4		x	4	4	24 "
Mile 471.....	4		x	4		40 "
Mile 881.....	2	6	x	2	6	25 "
Mile 102.....	2	6	x	2	6	22 "
Mile 1021.....	2	6	x	2	6	24 "
Mile 1031.....	2		x	2		34 "
Mile 103.....	2		x	2		24 "
Mile 104.....	3		x	3		24 "
Mile 115.....	2	6	x	2	6	30 "
Mile 1151.....	2	6	x	2	6	22 "
Mile 1191.....	3		x	3		40 "

Sidings.

The following sidings were laid or extended during the year:

Location.	Purpose.	Service.	Length.
			Feet.
N. Bay Jct.....	Lumber siding.....	T. & N. O. Ry.....	313
Trout Mills.....	Log delivery.....	Milne & Sons.....	869
Trout Mills.....	Saw mill.....	Milne & Sons.....	85
Woodland.....	Pulpwood.....	St. Catharines Pulp & Lumber Co.	355
Mile 101.....	Pulpwood.....	" "	769
Mile 201.....	Log loading.....	DeLaplanche Lumber Co.....	240
" 231.....	".....	Temagami Lumber Co.....	235
" 26.....	".....	Milne & Sons.....	808
" 26.....	".....	Ferguson & McFadden.....	863
" 301.....	".....	".....	867
Osborne.....	Log loader.....	Temagami Lumber Co.....	213
Temagami.....	General purpose.....	T. & N. O. Ry.....	513
Johnson.....	Crossing siding completed.....	" "	137
Mile 921.....	Timber limit.....	Gillies Bros.....	473
Latchford.....	General freight.....	T. & N. O. Ry.....	676
Cassiday.....	Log unloading.....	Empire Lumber Co.....	1,350
Mile 102.....	Ore loading.....	Silver Queen Mining Co.....	304
Cobalt.....	General siding.....	T. & N. O. Ry.....	798
Haileybury.....	Merchandise.....	(Haileybury Supply Co. & H. C.) (Dunbar.....)	1,378
New Liskeard.....	Extending " Y ".....	T. & N. O. Ry.....	329
Mile 122.....	Loading pulpwood.....	Pulp Co.....	377
			11,952

To prevent the possibility of cars running or being being blown away and running to North Bay from the sidings at Mulock, Widdifield and Woodland, derail switches were put in at the points named.

Sidings in Course of Construction, 1906.

Location.	Purpose.	Service.	Length.
N. Bay Jet.....	Coal chute siding.....	T. & N. O. Ry.....	
North Bay.....	Freight house spur.....	" " ".....	
Mile 3 $\frac{1}{2}$	Smelter.....	Montreal Smelting & Reduction Co.	
Mile 8 $\frac{1}{2}$	Pyrites mine.....	Smallman & Co.....	

The following sidings were taken up during the year:

Location.	Purpose.	Service.	Length.
N. Bay Jet.....	Construction of engine house ..	T. & N. O. Ry.....	691
" ".....	Transfer.....	" " ".....	350
Woodland.....	Pulpwood loading.....	St. Catharines Pulp & Lbr. Co....	355
Mile 8 $\frac{1}{2}$	Pyrites' mine.....	Smallman & Co.....	329

The grading in building all sidings for the T. & N. O. Ry. service was done by our own forces. The private sidings were in some cases graded by us and in other cases by the parties for whom the sidings were provided. Under the siding agreement the cost of grading, supplying ties and ballasting is borne by the party using the siding.

6,900 ties were used in new sidings during the year.

23,152 cubic yards ballast was provided and put in place.

Station and Station Grounds.

Woodland. A flag station 20 ft. x 30 ft. with necessary platform was provided.

Widdifield. A water service was installed, giving a domestic supply to the station and section house as well as affording fire protection. The station ground was filled in with sand and gravel, requiring 1,848 cubic yards.

A good road was constructed from our station to the concession road, a distance of 2,000 ft.

Diver. A telegraph office was established and a platform built 12 ft. x 50 ft.

Temagami. To provide for the large tourist traffic with which this locality is favored, the Commission decided to build an "artistic modern station." This building, 28 ft. x 65 ft., built of boulder masonry on concrete basement, with red tile roof, is about completed.

The present station will be remodelled and used entirely for restaurant purposes. An eight room station agent's residence was built at this point.

To afford storage for a supply of perfectly pure ice from Temagami Lake for the train service an ice-house 24 ft. square was constructed.

A water service, affording a domestic supply to the station, restaurant, section house and station agent's residence, was installed. This also gives a fire protection system for the station, freight shed and restaurant.

To provide proper facilities for approaching the new station and to make provision for a concrete platform, 8,720 yards of train filling was required and 558 cubic yards of solid rock excavated.

A concrete curb was built supporting a gravel platform. Next season a granolithic platform will be provided.

Latchford. A standard station agent's residence was built at this point.

A fire protection service was provided for the station and a domestic supply furnished the station agent's residence and section house.

To make a suitable approach and to level up around the station 1,411 cubic yards of material were brought in by train. To afford easy access to and from the freight shed, an unloading siding street was graded across our station grounds south of the station to connect with the street opened by the town.

Cobalt. To provide proper accommodation a 24 ft. extension was built on the south end of the general waiting room and a larger furnace with necessary radiators supplied. The interior of the building was remodeled, giving greater facilities for conducting business, and a ladies' waiting room was provided. An express room 14 ft. x 30 ft. was constructed at the south end of the freight shed and the station platform extended both north and south.

A standard station agent's residence was built on Lot 88 of the town site. A large amount of work was done making the approach from the town to the station as easy as possible. This required 2,376 cubic yards of train filling. In addition a road was graded from the station along the station grounds southward for about one-quarter mile.

The section house was moved from its position in the station grounds and placed upon Lot 89 of the town site next the station agent's residence.

Haileybury. The general waiting room was extended northward 18 ft., a ladies' waiting room provided and the interior of the building arranged to give additional accommodation. The platform was extended 100 ft. southward. The freight shed was extended by an addition of 20 ft. x 30 ft on concrete piers.

A standard station agent's residence was built at the north end of the station grounds. A well was dug and force pump provided.

The approach to the station grounds was improved and the grade of the main road leading from the town greatly reduced. Train filling placed 2,400 cubic yards.

New Liskeard. A cattle pen 50 ft. x 60 ft. with necessary platforms was provided.

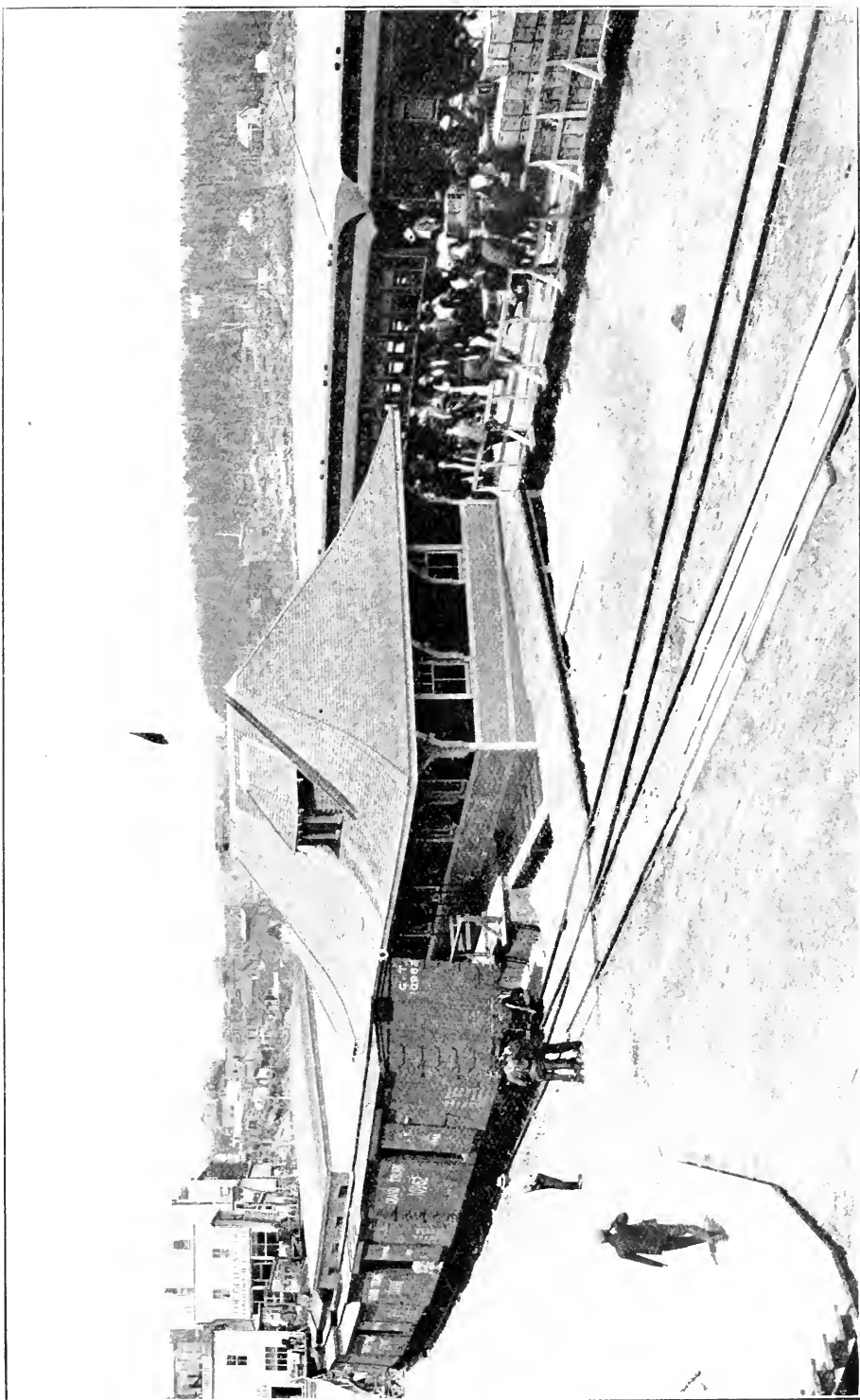
The station platform was extended northward a distance of 80 ft.

A bunk room for the enginemen was provided in the temporary engine shed.

A station water service was provided from the tank.

Uno Park. A combined passenger and freight station, containing agent's quarters, was built. Size 26 ft. x 61 ft., concrete foundations and hot water heating system.

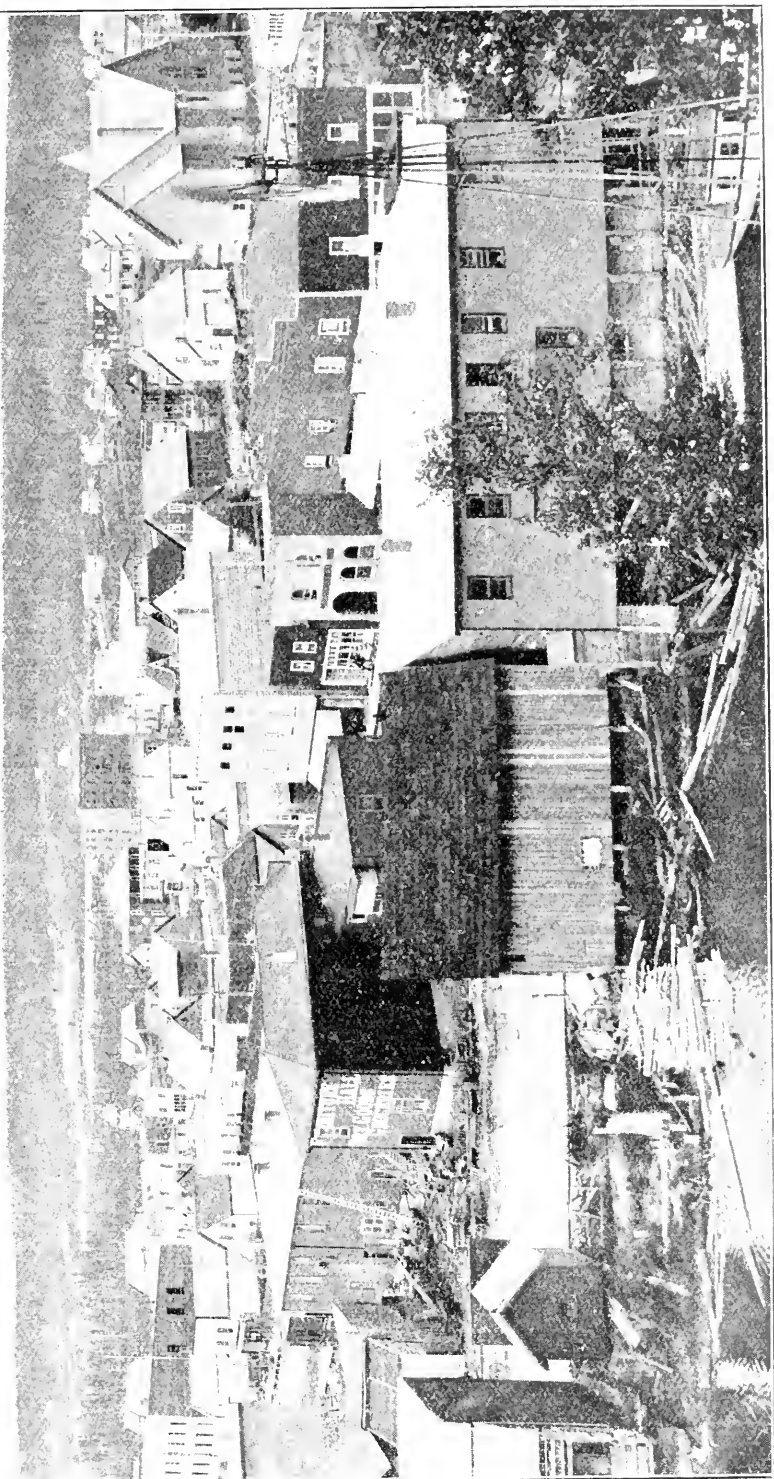
Thornloe. A flag station 20 ft. x 20 ft. and freight platform was provided.



Cobalt.



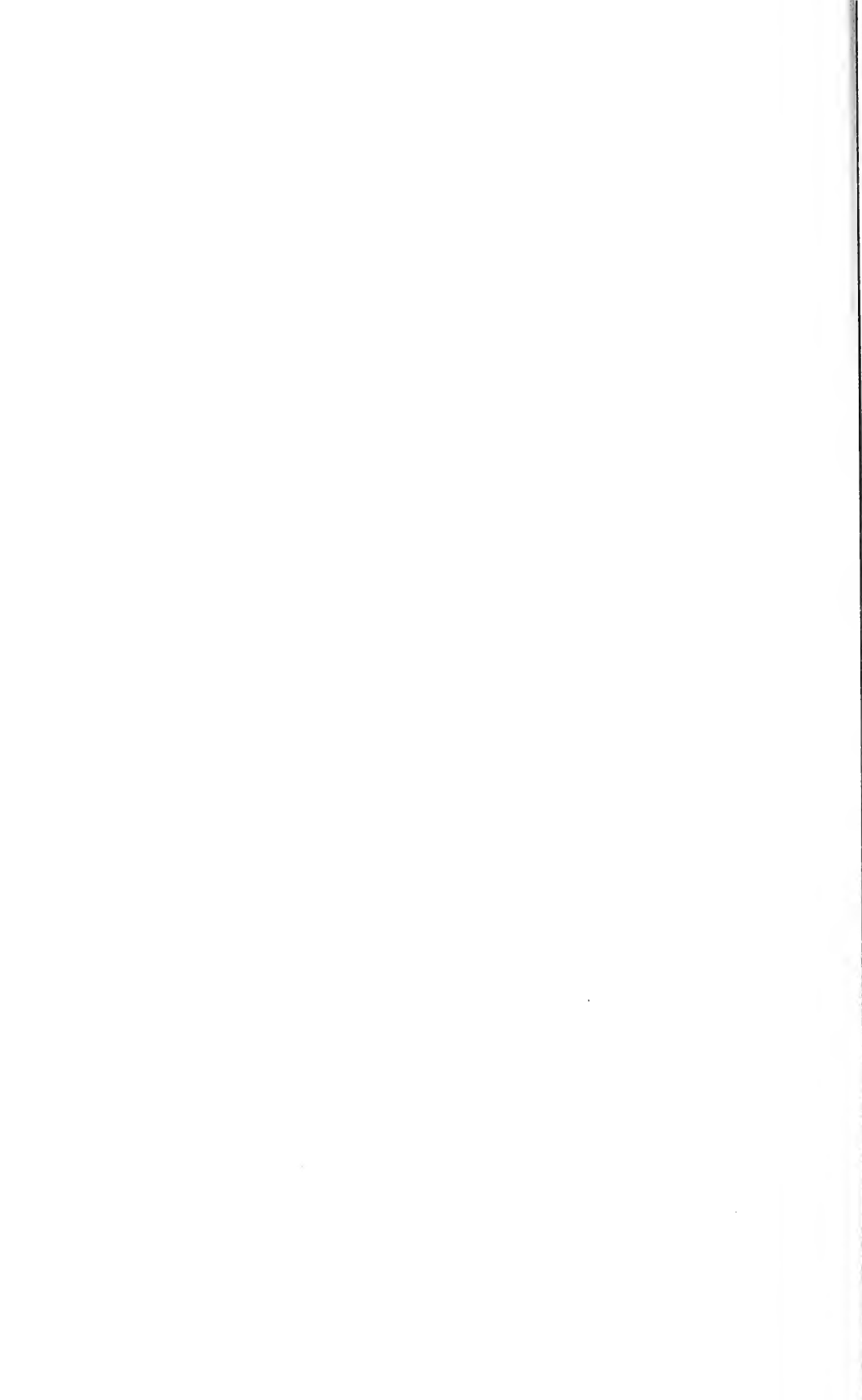
Haileybury.



New Liskeard.



Montreal River and T. and N. O. Ry. bridge.



Earlton. A combined passenger and freight station, containing agent's quarters was built. Size 26 ft. x 61 ft. on concrete foundations and hot water heating system.

Heaslip. A flag station 20 ft. x 30 ft. with freight platform was provided.

Section Houses.

The section houses originally built by contract proved hardly large enough. We have made an improvement on those at Temagami, Latchford and Cobalt by the addition of a 6 ft. verandah along the front and an extension summer kitchen at the rear. At Cobalt the section house was moved from the station grounds and placed on Lot 89 of the town site.

New section houses, similar to our standard station agent's residence, were built at Thornloe and Heaslip. The former is not yet completed.

Wells and force pumps in connection with the section houses at the following points have been provided:

Mulock
Moose Lake
Otter
Bushnell
Redwater
Doherty.

Water services were provided from tanks at the following points:

Widdifield,
Temagami,
Latchford.

Tanks.

A tank was built at North Bay Junction by our own men. Tenders were invited for the building of four tanks north of New Liskeard. The offer of Hasset & Gervais, of New Liskeard, was accepted, but the firm failed to furnish satisfactory security or even to diligently proceed with the work. We, therefore, ordered the materials and have now under construction by our own forces tanks at Miles 122 and Englehart.

Telegraph and Telephone.

Telephone. In July, 1905, a contract was entered into with Messrs Wyse and Middlemist, of Toronto, for the construction of a long distance telephone line from North Bay to New Liskeard. On account of the delay in getting cross arms this work was not started until late in the fall and was completed in March, 1906. The wires are No. 12 copper. There are four wires from North Bay to Temagami and two wires from this point north. The system never worked satisfactorily until a Superintendent of the Telegraph and Telephone System was appointed to take direct charge. Since August last it has given good satisfaction. It is free from noise and is not interrupted more than any first-class long distance line. Telephones have been placed in all stations and in section houses where no station exists. Several lumber camps use the line in connection with the movement of cars

for the log loading. Standard telephone booths have been placed at Cobalt, Haileybury and New Liskeard and connection is obtained with the Bell system at North Bay.

Recently a line was extended by agreement with the same contractors to Englehart and is now working through to that point very satisfactorily.

Telegraph. At the end of 1905 the telegraph system consisted of two wires from North Bay to New Liskeard with a single wire from that point to Englehart. During the year the third wire has been strung from North Bay to New Liskeard. The people line from this point to Englehart was strengthened and a second wire strung.

In June, 1906, a contract was entered into with Messrs. Wyse & Middlemist, of Toronto, to build a two wire telegraph line from Englehart to MacDougall's Chute, a distance of about 67 miles. This has been constructed about 59 miles and a temporary line strung to our most northerly engineer's camp.

An agreement has been entered into with A. R. MacDonnell whereby we are to provide materials and string a third wire from New Liskeard to Englehart, and in consideration of being allowed to use it while building his second contract, Mr. MacDonnell will pay the cost of putting up the wire.

In October last a telegraph office was opened in the business section of the Town of New Liskeard, a convenience much appreciated by the residents of the place.

Surveys.

Two locating parties were employed until October, when the location of the line from the end of Macdonnell's second contract to the Transcontinental Junction was completed and the party disbanded. Two locations for this particular section of the line were carefully investigated, one followed closely the valley of the Abitibi from MacDougall's Chute, and the other run farther inland on the plateau between the Frederick House and the Abitibi. The interior location was decided upon. Its grades are the same as those obtained by the river route, viz., .50 per 100 ft. rising north, and .04 per 100 ft. rising south. There is much less curvature on the interior route; fewer openings for drainage require to be provided and those of a smaller size. Less charges for maintenance on account of slides may be expected; it is the proper position to open up the country, and its estimated first cost is very little more than the river line. On the upper end of the adopted location there is no curve in a distance of 21 miles.

Trial lines and locations were completed for branch lines from Englehart to Charlton, eight miles from the south end of Cobalt Lake to the Kerr Lake mining region, a distance of four miles, and from the main line two miles north of Haileybury to the wharf in the town, about two miles. Tenders were received and the carrying out of the work in connection with the building of these three branches is being delayed only by trouble in securing the proper titles to the right of way required.

Lines were located from Nipissing Junction to our terminal at North Bay Junction, and continued to the freight depot at Regina St., this town (North Bay.)

Between Woodland and Mulock the track was recentred, and transition ends put on all curves. The track here was properly lined at the time the light coating of ballast was given to keep down the dust.

A careful investigation is being made of the country to the east of the line as at present constructed between Woodland and Joeko. From the reconnaissance and the preliminary line partially run, I am of the opinion

that it will be possible to get a grade between these points compensated for curvature not exceeding .75 per 100 ft. Our present maximum grade is 1.25 per 100 ft. on 6 degree curves, equivalent to about 1.50 grade compensated. The line will not be materially lengthened, and the cost probably not more than that of the present line. It will be possible to reduce the total amount of curvature between the end of the proposed change 1,000 degrees, and the maximum curvature from a 6 degree to a 4 degree.

Town Sites.

During the year complete surveys by properly qualified Land Surveyors were made of the town sites of Cobalt, Latchford, Temagami and Englehart. Outline plans showing all the land included in the town sites and plans of the portion sub-divided in each case have been filed. As more lots are required, the survey of the sub-division will be continued to meet the demand.

At Englehart Wooling Bros., contracted to do the grubbing and grading required to open certain streets of the town. In all 3.25 acres were grubbed, and 1,050 cubic yards of material removed in grading. For drainage purposes a large ditch was opened from the town site northward. Our efforts to make the place attractive succeeded and two banks now have branches in the town.

Terminals.

North Bay.

Engine and Machine Shop. In June last a contract was entered into with the Forest City Paving Co. of London, Ontario, for the construction of a reinforced concrete engine house and machine shop at North Bay Junction. All foundation work has been completed, and the main walls are up.

Owing to the inability of the steel manufacturers to supply the reinforcing rods before the cold weather set in it was necessary to close down the work until the spring. All material is now on the ground, and the building will be completed in the early summer.

Messrs. Sheldon, Limited of Galt, Ontario, have the contract for the hot air blast system of heating.

Turntable. The turntable required is on contract with the Locomotive Machine Co. of Montreal.

Coal Shed and Trestle. Messrs. Wyse & Middlemist of Toronto, have the contract for erecting a coal shed and trestle. The heavy framing is completed. Difficulty in securing the steel aprons delayed the putting into service of this much needed convenience. It will provide storage for about four hundred tons of coal.

Miscellaneous Buildings. Two coal docks, each 12x75 feet were constructed.

An extension to the lumber shed 20 ft. x 24 ft. was built. To take care of the kiln-dried material, such as flooring, etc., an additional lumber shed 30 ft. x 60 ft. was built. At the rear of the carpenter shop a platform 16 ft. x 75 ft. was put up.

On account of the oil house having been burned on the night of July 1st, a new oil house 16 ft. x 24 ft., and an oil shelter 16 ft. x 20 ft. were built.

In addition to the above, several small coal sheds were built, and general repairs made to the buildings now rented, and which are on the property purchased in connection with the right of way into Regina Street.

The interior of the Station at North Bay Junction was fitted up with additional shelving for stationery and room for electrical supplies and fixtures for all kinds of small stores.

Regina Street. To gain an entrance into the Town of North Bay, a right of way was purchased from North Bay Junction to Regina Street. The buildings which were not on the property required for the present contemplated tracks were rented. Four dwellings were removed under an arrangement with Mr. Jas. Bailey of North Bay. New foundation walls were put under these, and they are now also rented. Nearly all these buildings are occupied by employees of the Commission. A freight shed with a concrete foundation 30 ft. x 170 ft. has been built, and will be ready for traffic when the grading of the tracks leading into it is completed. In the front end of this building, facing Regina Street, ample office accommodation for the freight staff has been provided.

All the work in connection with the rock excavation on the line into Regina Street, as well as the piling and concrete work of the abutments of the bridge across Chippewa Creek, was done by Swan Swanson of Sault Ste. Marie, at his tender price. The steel span is under contract with the Locomotive & Machine Co. of Montreal.

Permission was freely given by the Town of North Bay to cross the streets with the Regina street line.

At present persons driving to Callander, and to the shore of Lake Nipissing cross our main line near the present station at North Bay Junction, and also across our yard just east of the new Machine Shop. Arrangements are being made to change the former crossing to a point north of the main line switch leading to the "Y", and to close the latter entirely. It is hoped that this can be effected by building a bridge across Chippewa Creek at Monck Street, and opening a new street through the property belonging to Mrs. Parks to the boundary road between the Townships of Widdifield and Ferris.

An arrangement has been made with the Town of North Bay to secure water from the town service for railway purposes at the North Bay Junction terminal.

Englehart.

At this point, in addition to the ordinary right of way, 528 acres of land was secured for a Town site and terminal purposes. All railway works have been laid out on the east side of the track, leaving the west side free for town site and station facilities. To keep all shunting off the large steel viaduct across the Blanche river, the south switch of the yard was located 2,000 ft. north of the North bridge abutment.

Engine House and Machine Shop. In June, 1906, a contract was entered into with the Forest City Paving Co. of London, Ontario, for the construction of a reinforced concrete Engine House and Machine Shop. All piling has been driven, but the concrete work was not started owing to the severity of the weather. It will be completed in the early summer.

Sheldons Limited of Galt, Ontario, have the contract for installing a hot air blast system of heating.

Turntable. The turntable required is being manufactured by the Locomotive & Machine Co. of Montreal.

Coal Shed and Trestle. Messrs. Wyse & Middlemist of Toronto, are under contract to construct a coal trestle and storage pocket similar to that being built at North Bay Junction. Storage capacity four hundred tons. This work is being continued, and if the steel manufacturers promptly supply the aprons will be completed in the early spring.

Station. As no bids were received in answer to the advertisement inviting tenders for the construction of a station at this point, the work is now being done by employees of the Commission. It is a frame building 35 ft. x 125 ft. on a concrete basement. It provides office, waiting room, restaurant and dwelling for the Agent and Restaurant Keeper. Four spare offices are provided for Divisional Officers.

A freight shed with temporary Station Master's office in one end has been built on concrete piers, size 30 ft. x 60 ft.

All filling necessary and laying of all tracks required is being performed by A. R. Macdonell at his contract price.

Second Contract.

A. R. MacDonell.

By the contract entered into on June 7th, 1904, the contractor agreed to have the whole line from New Liskeard to 100 miles north completed by December 31st, 1905. Many causes acted together to prevent this being carried out, and moreover to so delay the work that it was found necessary to grant the contractor an extension of time to November 30th, 1907.

In a former part of this report mention was made of some of the delays caused between New Liskeard and Englehart on account of the clay slides. The contractor was much troubled by similar slides between Englehart and Boston Creek. The bank south of the cutting known as Swansons' settled and flowed into the adjoining woods a number of times. Some of this material has practically no angle on repose, but runs until its surface is almost horizontal. It flows over the ends of arch culverts, blocks, the streams and generally causes a good deal of trouble.

The excavation at Swanson's cutting is not yet completed. A steam shovel is now working, and the material is dumped from a temporary pile trestle built in a ravine entirely off the right of way. It is much more economical to waste material of this nature than to put it in the embankments and have them slide all over the country.

While an investigation of the different routes from MacDougall's Chute northward was being conducted, it was considered advisable to stop the work of Macdonell's contract about the 93rd mile. Owing to the uncertainty as to what course would be pursued, both as to direction from MacDougall's Chute and as to time of construction, the stores which the contractor had at MacDougall's Chute were temporarily taken over by the Commission. A considerable quantity was disposed of for cash to sub-contractors, prospectors, land-surveyors and others, and when it was decided to extend northward at once, stock was taken and the contractor took back, at the prices originally paid, the remainder of the stores and equipment. On account of the change of line it was, of course, necessary to pay the contractor for any work done on the line as originally located together with the cost of the camps that had been built along that portion of the line abandoned.

The contractor was delayed for some weeks at the Wild Goose River trestle. The stringers and posts for this structure were brought from Bri-

tish Columbia, and during the great rush of wheat easterward during the fall, cars of ordinary non-perishable material were side-tracked by railways for days at a time. This structure was crossed about December 15th.

At the present time the track is laid to within three miles of MacDougall's Chute.

The line from New Liskeard to Englehart, with the exception of the filling of two small depressions, putting some additional ties in the track, and making some general fence repairs, is practically completed. From Englehart to the Wild Goose, the line has been given one lift of ballast, and the track is in fair condition for trains. The contractor maintains a regular service over this part, going north from Englehart to the end of steel, three days each week and returning on the alternate days.

The track is laid on the natural ground around Swanson's cutting, while the steam shovel work is being done.

On the upper seven miles the contractor is cutting roads, building camps, and clearing the right of way.

During the coming working season there remains to be done on this contract, the following:—

The grading of the seven miles from MacDougall's Chute north, the track laying on the same portion and the ballasting of one lift from Englehart to the end of the contract, a distance of 74 miles. Four steam shovel ballasting outfits will be available; so the work should easily be accomplished.

A good quality of ballast is being secured. All through the clay country, there are occasional ridges of sand and gravel. The finer of this material is used for surfacing and for the first lift of ballast; the coarser material is used as a final lift.

After the banks are completely settled, and the track has obtained a good firm bottom, we will have on this division a track of very light grade and easy curves, which will be cheaply maintained, and over which good time may be made with passenger trains and heavy freight trains easily hauled.

REPORT OF J. H. BLACK, SUPERINTENDENT T. & N. O. RAILWAY.

As the operation of a railway is only one of results, all of which is in the hands of the Audit Department, and as Road, Engine and Car Departments of mine have made minute reports, as I understand all that is required of me are general remarks.

January 1st to June 1st, ran passenger service between North Bay and New Liskeard, daily except Sunday, consisting of two baggage cars, two second class, one first class coach and Pullman, each way. Commencing June 1st ran two passenger trains each way each day, leaving initial points morning and afternoon, besides local trains twice each way between New Liskeard and Latchford. On October 1st we started operating mixed service between New Liskeard and Englehart.

We were short of passenger rolling stock up to end of April owing to car builders not being able to obtain their supply of tired wheels from German markets, but, thanks to our connections, they furnished on request the equipment we required. During the year we increased our passenger equipment by four first-class cars, five workmen's, four baggage and express cars, four second-hand coaches for local, freight equipment by 25 flat cars, which made our total passenger, four baggage and mail, four baggage and express,

eight first-class cars, four leather seated and backed cars and seven slatted seated second-class cars. Our freight equipment consists of 223 flats, fifty boxes, ten stock cars. During the year our engine equipment was increased, fourteen freight and passenger and two switching engines. One of the switching engines was required to make up our trains in our yard at North Bay, as C. P. R. made no effort to marshall our cars in station order, nor do they furnish us tonnage capacity for our engines. We find it economical to do this work, as our trains lost from three to seven hours each day switching and tonnage. This engine, of course, will be required when our own terminals have been completed. The other switching engine has been sent to New Liskeard to make up trains at that point, switch and spot cars at New Liskeard, Haileybury and Cobalt, at which points local sidings become blocked owing to shortage of teams to cart freight away, and in some cases lack of disposition on part of our customers to do their work properly, but desirous to use cars for store houses, and sell contents from car door instead of providing themselves with store houses. By strict adherence to car service charges and by frequent placing of cars by switching engine, we are glad to say are succeeding in keeping cars fairly well supplied.

During year we ran with care and caution over all newly constructed portions of our track, and pleased to be enabled to say, though at times severely criticized and often abused for being slow, we did not have one serious derailment, nor did we injure a passenger. The year was particularly free of accidents of any description. Only one was attended by anything at all serious, viz.: the rear-end collision at Trout Lake on July 4th, caused negligence of brakeman, who was dismissed. The number of trains run during the year, and class of labour we are compelled at times to employ, great credit is due the trainmen, enginemen and crew for care generally taken of trust imposed in them.

On commencement of year our telegraph and telephone lines were in serious condition. Owing to poor construction and the right-of-way not being cleared far enough back from track, serious breakages by falling trees, etc., caused no end of trouble and annoyance. We have cleared right-of-way of all dangerous trees; have re-constructed and properly braced the whole line, and have strung two additional wires, North Bay to New Liskeard. Have installed a duplex system on one wire, which gives us three circuits to New Liskeard and four to Cobalt, and as we purpose stringing another wire, we will increase circuits four to New Liskeard and five to Cobalt, which, if found not sufficient, we shall install a quadruplex system, which would give us nine circuits to Cobalt. We have three telegraph operators at New Liskeard, three at Haileybury and four at Cobalt and two at Latchford. We have opened a town office in New Liskeard, and will open one in Haileybury as soon as the municipality pass necessary by-laws. We are furnishing good telegraph service to the northern country.

REPORT OF W. D. CUNNEYWORTH, FREIGHT AND PASSENGER AGENT TEMISKAMING AND NORTHERN ONTARIO RAILWAY FOR THE YEAR 1906.

Freight Department. The opening months of 1906 bright, weather conditions were such that lumber operations were conducted on an extensive scale between North Bay and Mileage 40 and carried out successfully, fur-

nishing a heavy tonnage of logs, square timber and pulpwood, outward; as well as heavy tonnage of hay, oats, pork and general lumber supplies inward to the different camps. Preparations for lumber operations 1906-7 commenced early, supplies and horses going in early in the month of August, and the winter's cut, it is expected, will exceed that of last year. Requisition has been made by the several lumber firms for flat car equipment of over 200 cars per day, which means a total requirement of over five hundred flat cars per day.

At Mileage 4, Trout Lake, a smelter is in the course of erection by the Montreal Smelting & Reduction Company to smelt Cobalt and other ores. This company has erected the buildings required in connection with the works, which are of a substantial character. It is anticipated that smelting operations will be started by June 1st, 1907.

At this point, Trout Mills, two saw-mills are located, which have been in active operation during season. Preparations are under way to increase the output of these mills.

At Diver, Mileage 40, bush operations are carried on during the whole year by the Cleveland-Sarnia Saw-mills Company, log shipments being regularly made to Sarnia.

At Grey, Mileage 75, and Rib Lake, Mileage 84, are deposits of iron pyrites, copper and arsenical ores. Small shipments from these points have already moved and additional equipment is being installed at mines to increase output.

At Latchford are located the mills of the Empire Lumber Company, and which have been in constant operation during the season.

At this point distribution of miners' supplies, etc., for the Montreal River District, covering a distance of upwards of twenty-five miles, takes place.

Indications are that a heavy tonnage into this country will take place, as on both sides of river has been staked, on what is looked upon as good prospects in various stages of development. Should expectations be realized, Montreal River should be shipping ore during the coming season.

Gillies, Mileage 99, the headquarters of the Gillies Bros. Lumber Company, and distributing point for a number of lumber camps.

Cobalt, Mileage 103, is the mining centre of the Cobalt Camp, and has a population of three to four thousand people. Heavy shipments of mining machinery and supplies have been steadily arriving at this point during the season. Outward tonnage of ores has been moving regularly each month.

New mines being opened up and old mines adding machinery to increase output of ore.

Haileybury, Mileage 108, situated on the bank of Lake Temiskaming, the homes of many mine owners and miners, who proceed daily to the mines at Cobalt and surrounding country, returning each evening to their home.

A few miles south of Haileybury starts the Clay Belt. The land is nearly all taken up between this point and New Liskeard, farms being cleared and considerable tonnage in the way of settlers' effects, etc., with exchange at this point with the Temiskaming Navigation Company's steamers; building material of all kinds steadily moved all the year.

New Liskeard, Mileage 113, the home of many owners of mines, who go daily to Cobalt and other camps, returning in the evening. Good agricultural land surrounds this district, which is being rapidly cleared and put under cultivation. Building material of all kinds in large demand; large tonnage moving steadily all year.

New Liskeard has also lake connections with the Temiskaming Navigation Company's steamers, and exchange of tonnage with steamers. Prospects for New Liskeard, as well as Haileybury, are bright, assuring railway a steady traffic.

Freight business for points north of New Liskeard to Englehart, etc., was taken over on October 1st, 1906, and since that date a heavy tonnage in pulpwood, lumber, etc., has been moving.

The country lying north of New Liskeard to Englehart has been fairly taken up and considerable tonnage furnished in the way of incoming settlers, etc.

Indications are that many settlers will move into this country next season. The country around Charlton Branch from Englehart (at the foot of Long Lake) has many settlers, and more moving in; good lands, timber, etc., etc.

Charlton, a village of about five hundred population, saw-mill working steadily all season, and which furnishes a million and a half to two million feet of lumber.

To move this lumber this season will be hauled to Englehart with quantities of pulpwood and other forest products, which assures good tonnage during coming season from this district.

Passenger Business. Referring to statistical statement will show a marked increase in passenger business.

Since opening of the year there has been a steady movement of passengers north and south. The closing month of the year indications point to large increase in passenger traffic next season.

There is every indication of continuance, with an increase brought about by opening up of Larder Lake fields; increase in settlers is also looked forward to.

The tourist traffic during tourist season was encouraging and increases are looked for during the coming year.

To furnish the necessary accommodation the past year, one through passenger train each way was required, also local service on north end between Latchford and New Liskeard, twice daily. This local service has been performed south from New Liskeard in the morning at hours suitable for the miners and others going to mines, returning from Latchford in the afternoon, so arranged as to meet all requirements of miners returning to their homes at the various points between New Liskeard and Latchford, and well patronized.

On July 1st summer service was inaugurated, giving two through trains each way between North Bay and New Liskeard, furnishing direct connections with the Grand Trunk and Canadian Pacific trains arriving and departing at North Bay. Through Pullman service was also arranged between Buffalo and Temagami during tourist season. This service was performed until September 30th, when winter service was put in force.

On October 1st mixed train service was put on between New Liskeard and Englehart, leaving Englehart at 8 a.m., returning leaving New Liskeard at 4 p.m., making connection with express train from North Bay.

The closing month of this year traffic has been heavy, the Christmas and New Year's traffic encouraging, and am pleased to state we closed the year's business without accident or injury to any passenger.

Baggage. During the year there were handled between North Bay and Englehart 83,126 pieces weighing 6,650,080 pounds, or 3,325 tons.

REPORT OF ARTHUR A. ALLAN, MASTER MECHANIC OF TEMISKAMING AND NORTHERN ONTARIO RAILWAY.

MOTIVE POWER AND CAR DEPARTMENT, ANNUAL REPORT 1906.

New Locomotives. During the year 1906 the following new locomotives have been added to the motive power equipment of this road:

Four locomotives, Numbers 105, 106, 107 and 108, built by Canadian Locomotive Works, Kingston, Ont. Were received in March and are of the ten-wheeled type cylinders 19 inches in diameter, 24-inch stroke. Diameters of drivers of first two engines 56 inches, and second two 62 inches, total weight of engine and tender in working order, 229,000 lbs. They have been used mostly in freight trains.

Four locomotives, numbers 111, 112, 113 and 114, were built by The Locomotive and Machine Company of Montreal. These engines are also of ten-wheeled class with cylinders 19 in. x 24 in.: diameter of drivers, 62 inches. Total weight of engine and tender in working order, 262,570 lbs. They were received in June and have been used mostly in passenger service.

Two six-wheeled switching engines were received from the Canadian Locomotive Works, Kingston, Ont., in November. These have cylinders 19 in. x 26 in., and drivers 50 inches in diameter. Total weight of engine and tender in working order, 213,000 lbs. These engines are Numbers 150 and 151.

Locomotive Mileage. During the year 1906 the following engines belonging to this railroad have run the mileages as shewn below:

Engine No.	Miles, 1906.	Total Mileage of Engines.
101	34,807	83,529
102	21,868	69,933
103	21,003	70,888
104	36,452	85,914
105	19,966	19,966
106	20,095	20,095
107	19,564	19,564
108	26,416	26,416
109	31,089	40,875
110	25,356	35,521
111	16,948	16,948
112	22,098	22,098
113	14,606	14,606
114	15,193	15,193

Engine Despatch. The following is a statement shewing the number of engines despatched from the different terminal points during the year:

Terminal Station.	Number of engines despatched.
North Bay	1,037
New Liskeard	1,414
Englehart	92

Repairs and Renewals to Locomotives. During the year the locomotive equipment has been maintained in a proper manner. The repairs and renewals necessary from time to time have been executed thereon.

Engine 101 has received a general repair, driving tires have been turned, engine equipped with steam and repainted.

Engine 102 has been given general repair, has had driving tires turned, 63 tubes renewed in boiler, air signal and steam heat applied, and engine and tender repainted.

Engine 103 has had general repair, driving tires have been turned, air signal equipment and steam heat applied, new cab, and engine and tender repainted.

Engine 104 has been given light repair.

Engine 105 has received heavy repair, driving tires turned, engine and tender painted.

Engine 106 has undergone heavy repairs, driving tires turned and engine and tender painted.

Engine 107 has been given heavy repair, driving tires turned, and engine and tender repainted.

Engine 108 has received heavy repair, driving tires turned, engine and tender painted.

Engine 109 had necessary running repairs and maintained in efficient condition.

Engine 110; has not been necessary to have this engine in the shop for general overhauling during the year, but necessary running repairs have been sufficient for proper maintenance in service. This engine has been equipped with pilot and head lamp on rear of tender, being engaged in passenger service on the run between Latchford and New Liskeard. This engine has also been equipped with four pairs of new tender wheels and axles.

Engines 101 and 104 have been equipped with rapid unloader apparatus for ballast train service.

The following material has been manufactured for repairs and renewals of locomotives:

Two new engine cabs, one applied to engine 103, which was damaged by fire, the other kept for spare. Five new engine pilots completed, also twelve new tool boxes, for use on engines.

Each engine has had boiler washed out once every two weeks when in regular service. Stay bolts in fire boxes have been regularly tested every three months, and renewals have been made where necessary.

Nettings, ash pans and dampers have been regularly examined at end of each trip during the summer season as a precaution against fire. During the damp weather and at such times as the danger from this source would be reduced to a minimum, nettings, ash pans and dampers have been examined twice a week.

During the year 112 couplers have been received and applied to engines and cars. Twelve pairs of cast iron truck wheels and four pairs steel-tired wheels have been received for this service.

New Coaches. Seven new first-class coaches, Nos. 103, 104, 105, 106, 107, 108, and 109, have been received and put into service. There are at present four more coaches of this class under construction by Crossen Car Company of Cobourg, Ont. Will be numbered 110, 111, 112 and 113.

Four second-class cars have been purchased (second hand) from Hicks Company, Chicago, Ill., Nos. 16, 18, 20 and 22.

Three new workmen's cars have been received and put into service, Nos. 10, 12 and 14.

Five workmen's cars at present under construction by the Rhodes-Curry Company, Amherst, Nova Scotia, Nos. 24, 26, 28, 30 and 32.

Repairs to Coaches. Repaired seven passenger coaches, 100, 101, 102 and 2, 4, 6 and 8, having painted same and turned coach tires.

Have built three sets of steps and six step-ladders for coaches.

Have given heavy repairs to three baggage cars, Nos. 1, 3 and 5. Car 3 has had four pairs of tires turned, and car 5 has three pairs.

New Baggage Cars. Five new baggage cars have been received from the Crossen Car Company of Cobourg, Ont., and placed in service. Numbers 7, 9, 11, 13 and 15. One second-hand baggage car, No. 17, has been purchased from Hicks Company of Chicago.

New Cars. Twenty-five new flat have been received from Rhodes, Curry & Co., Amherst, Nova Scotia, August, 1906.

Have seventy-five new flat cars now under construction by Rathbun Company of Deseronto, Ont.

New Conductors' Vans. Have received and put into service seven new conductors' vans, Nos. 52, 53, 54, 55, 56, 57 and 58.

Repairs to Vans. Have repaired and repainted vans 50 and 51.

Freight Cars. Have rebuilt T. & N. O. flat car 60,051, new sills, etc. Have converted 25 box cars into boarding cars for Construction Department.

Eight pairs of hose bag racks for baggage cars and vans for carrying spare air brake and steam heater hose, and six fusee racks for vans have been supplied.

Steam Shovel. Have received one new "Victor" steam shovel manufactured by Toledo Foundry and Machine Company, Toledo, Ohio, April, 1906.

Rapid Unloader. During April, 1906, received one second-hand rapid unloader from F. H. Hopkins Company, Montreal, Que.

Steam Wrecking Crane. Have received from Industrial Works of Bay City, Michigan, one new steam wrecking crane for heavy lifting, clearing wrecks, etc.

Auxiliary Equipment. In addition to steam wrecking crane an auxiliary equipment has been fitted up and is maintained ready for service.

Repairs to Flangers and Snow Plows. Have repaired snow plows No. 1 and 2, equipped them for winter service. Flangers No. 1 and 2 have also been repaired. Charges for repairs to snow plow No. 2 have been made against Contractor Mr. A. R. MacDonnell, New Liskeard, Ontario, as damage occurred to plow while in service in construction of the line.

Car "Temagami." One map rack supplied for Official Car "Temagami." Also new cabinet in kitchen. Car repaired, cleaned and revarnished.

Car "Abitibi." New draft timbers, sills and steps. Car repainted and revarnished, inside pipes gilded.

New Machinery. The following new machinery has been received and installed during the year:

One 36 in. lathe from McGregor, Gourlay Co., Galt.

One driving wheel lathe from John Bertram and Sons Co., Dundas, Ontario.

One sand drier complete.

One single head bolt cutter from John Bertram and Sons Co., Dundas, Ontario.

Shop Equipment, Repairs and Renewals. Have made repairs to six wheel barrows. Machine shop and carpenter shop have equipped with steam heat pipes and apparatus. Fitted up sand drier. Fitted up new forge in blacksmith shop for repairs and renewals of locomotives and car

springs. New water tank constructed at North Bay Junction shops. Temporary coal dock also been placed at the shop for coaling locomotives. One new coal chute in course of construction at North Bay shop. Made and painted one time check board for use Locomotive Foreman's office.

Pattern Making and System of Numbering. Necessary patterns have been made from time to time for repairs and renewals of different parts of locomotives, cars, and other equipment, by the St. Thomas Brass Co., St. Thomas, Ontario, and the Nipissing Foundry and Machine Co., North Bay, Ontario. Patterns are now being made at shops of this Company at North Bay Junction at reduced expense. All patterns are the property of the Temiskaming and Northern Ontario Railway, and proper record is kept of the location of same.

Proper system of numbering all patterns and classifying has been adopted.

Stores Department. Have supplied six fire pails, four water barrels, and one ladder, and painted same for use of Stores Department.

Have fitted up car 60,180 with shelving, bins, etc., to be used as store car in delivering material to various stations.

Bridge and Building Department and Transportation Department. Have rebuilt two baggage trucks for Latchford and Cobalt stations. Supplied forty new ladders for use of stations and seven train boards of sheet iron. Fifteen sets of crossing signs, and 150 mileage boards.

General Offices. Windows frosted and painted in General Offices, Ferguson Block, North Bay, doors, etc., lettered. Six new desks, one blue print cabinet for offices at North Bay Shop. Two desks repaired, one new counter.

Road Department. Have built fourteen hand push cars for use of section men in Road Department work. Have built eight new hand cars for use of road construction departments. Fitted up forty flat cars for ballast train service, equipping same with aprons, hinges, etc., for use with rapid unloader, and gravel plows. Have made necessary repairs from time to time on gravel plows, rapid unloader, etc. Have completed 150 snow plow boards.

Work Done and Repairs made for Outside Companies and Firms. Have made repairs to one locomotive belonging to Cleveland-Sarnia Saw Mill Company of Sarnia, Ontario. Putting new false bridge in cylinder. Have turned two sets of driving wheels, and six pairs of coach wheels for A. R. MacDonnell, Contractor. Have made necessary repairs to one concrete mixer for Forest City Paving Co., who have contract for new round house, &c., at North Bay. Accounts have been rendered to cover.

Have loaned steam wrecking crane, and engineer in charge on necessary occasions to A. R. MacDonnell, Contractor, New Liskeard, for use on construction work, for which charges have been made and accounts rendered.

Have put in one pair of cast iron truck wheels for locomotive No. 5 belonging to Canada Construction Company. Account rendered.

Repairs to Foreign Cars. Have rendered proper bills against foreign roads for repairs made to cars by this railway in accordance with Master Car Builders' Association Standard Code of Rules, governing condition of, and repairs to freight cars for interchange of traffic.

New Liskeard Engine Shed. Water service has been installed at New Liskeard from water tank to station building, for purposes of fire protection, piping used two inches in diameter.

Two tubes eight feet in diameter and eight feet deep installed for use of locomotives taking water at that point.

Ashpit has been placed in connection with engine shed, for cleaning ashpans and grates.

Pumping Stations and Pump House. Pumping plant and pump houses at Widdifield, Moose Lake, Redwater, Temagami, and Latchford have been properly maintained, regularly inspected, and have had necessary work done with regard to cleaning tubes and boilers, also repairs to pumps.

Shop Fire Protection. A system of fire protection has been installed in the shop at North Bay Junction, having about 300 feet of two inch hose suitable for the purpose, five fire hydrants, fifteen water pails, five stands, and three fire extinguishers.

Present Equipment. The motive power equipment, freight and passenger rolling stock of this railroad at present consists of the following:—

- 14 Road Engines.
- 2 Switch engines.
- 2 Official Cars.
- 10 First Class Passenger Cars.
- 11 Second Class Cars.
- 9 Mail, Baggage and Express Cars.
- 10 Stock Cars.
- 50 Box Cars.
- 223 Flat Cars.
- 9 Conductors' Vans.
- 2 Snow Plows.
- 2 Flangers.
- 1 Rapid Unloader.
- 1 Steam Wrecking Crane.
- 1 Steam Shovel.
- 2 Gravel Plows.

REPORT OF ARTHUR A. COLE, MINING ENGINEER.

Mining Report for the Cobalt Camp for the Calendar year 1906. The year 1906 in the Cobalt mining district has been marked by many very rapid advances. Shipments of Ore increased from 2144 short tons in 1905, to 5666.57 tons in 1906. (See detailed Table.) Of this total 840 tons were treated in Canada.

Many rich veins were discovered during the year, but with two or three notable exceptions these were on properties that already had valuable known deposits.

Actual mining operations in the camp, show a marked improvement over the oftentimes crude methods of surface work of 1905. Regular underground mining work is fast being undertaken, and the ratio of machine work to hand work is steadily increasing.

Faith in the stability of the district is evidenced by the amount of machinery that has been installed during the last twelve months. At the end of 1905 three companies had steam plants of a total boiler capacity of 150 H.P., while now 42 companies have steam plants of a total boiler

capacity of 3246 H.P. The camp can also boast of 20 air-compressor plants installed during the year. The above figures do not include many plants that have been ordered, but are not yet on the ground.

The Temiskaming & Northern Ontario Railway Commission now has five properties under lease and in operation, viz.:—

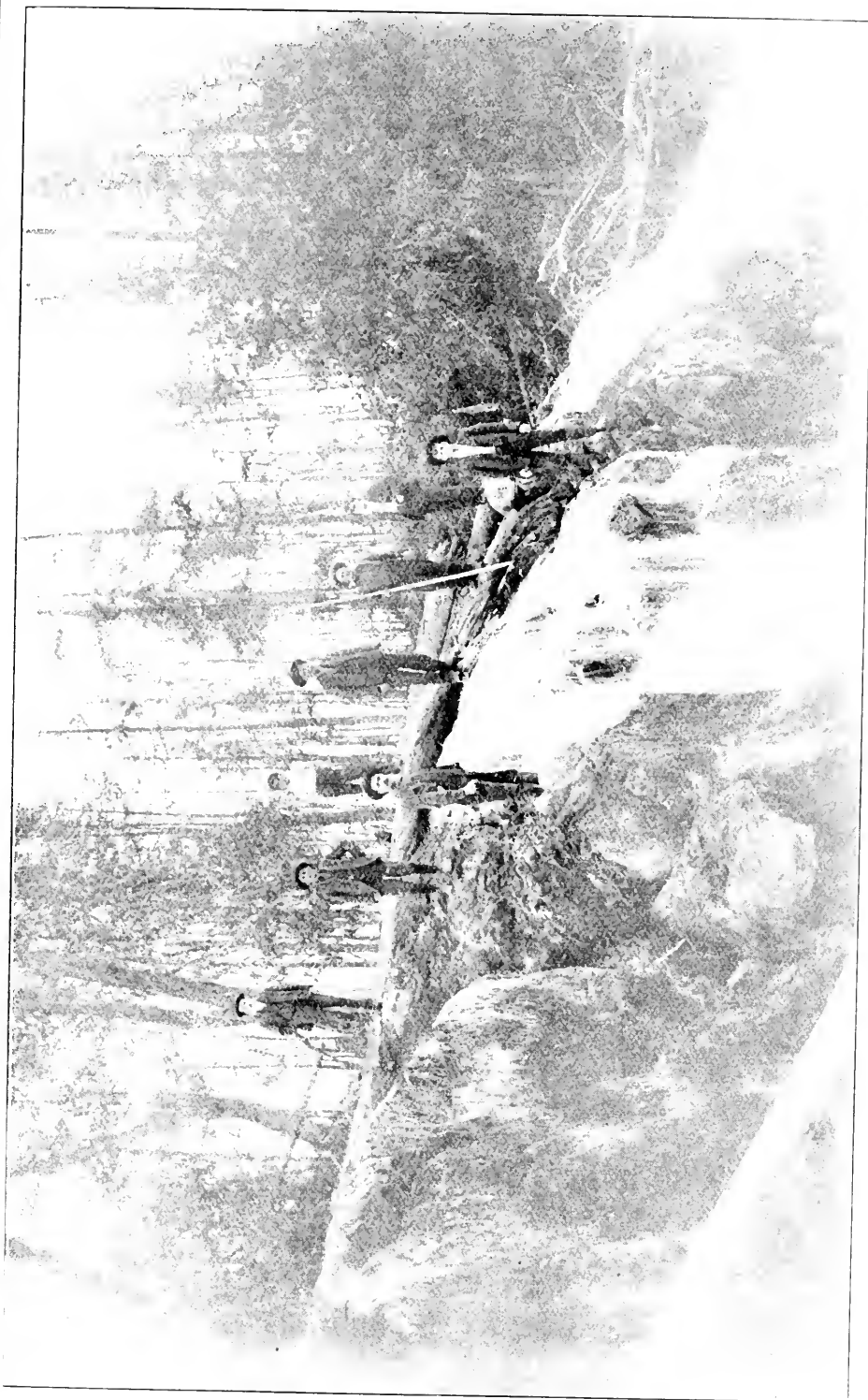
- (1) The Cobalt Townsite Mining Company.
- (2) The Nancy Helen Mine.
- (3) The Right of Way Mining Company.
- (4) The Wright Mining Company.
- (5) The Railway Reserve Mines, Limited.

These companies have done considerable development work, and have made satisfactory progress considering the short periods they have been operating. The Right of Way Mining Company shipped two cars of ore in December, aggregating 46.25 tons to the works of the Orford Copper Company, at Copper Cliff, Ontario.

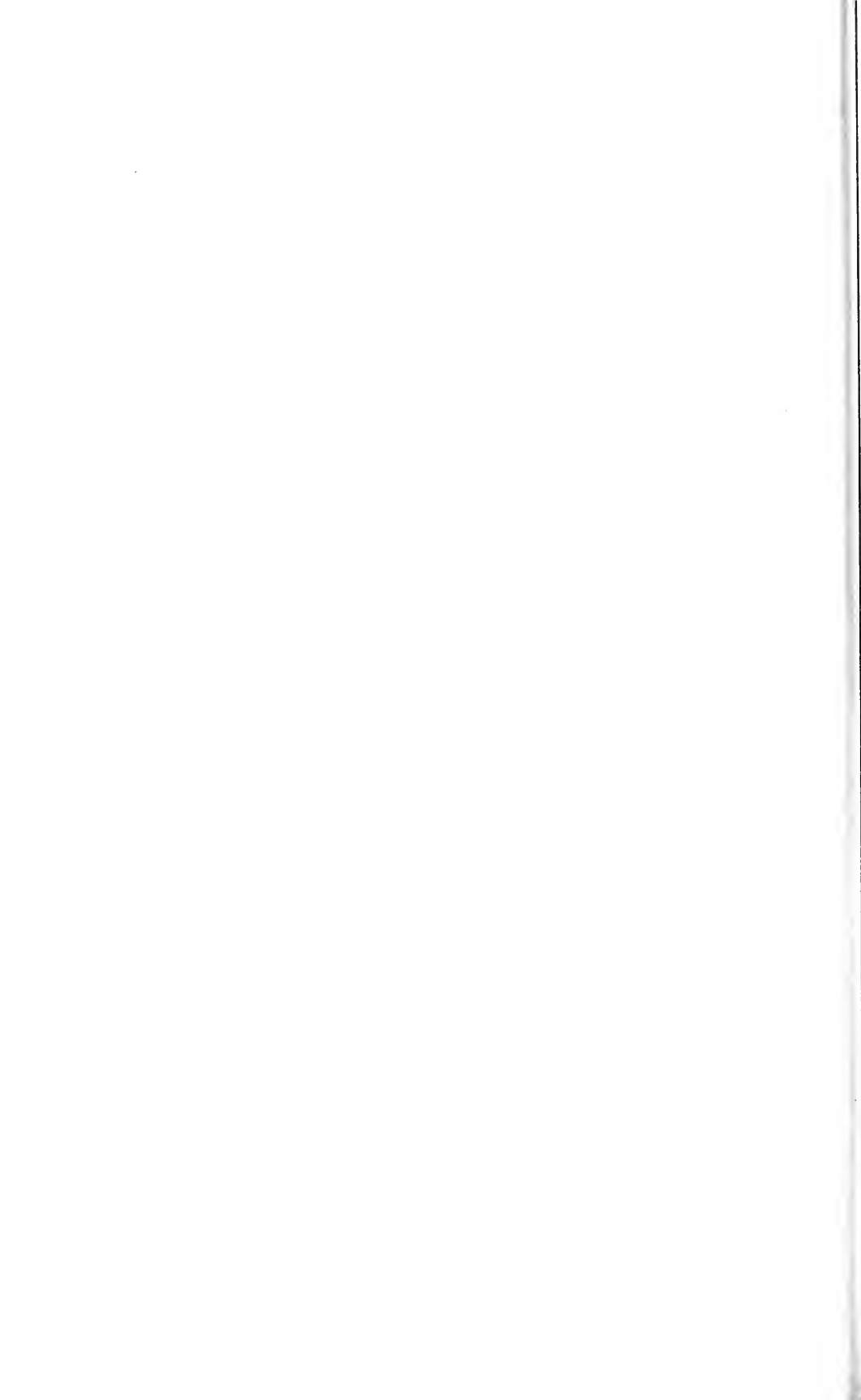
STATEMENT OF ORE SHIPPED FROM CORALT STATION DURING THE CALENDAR YEAR 1906.
(Tons of 2,000 pounds.)

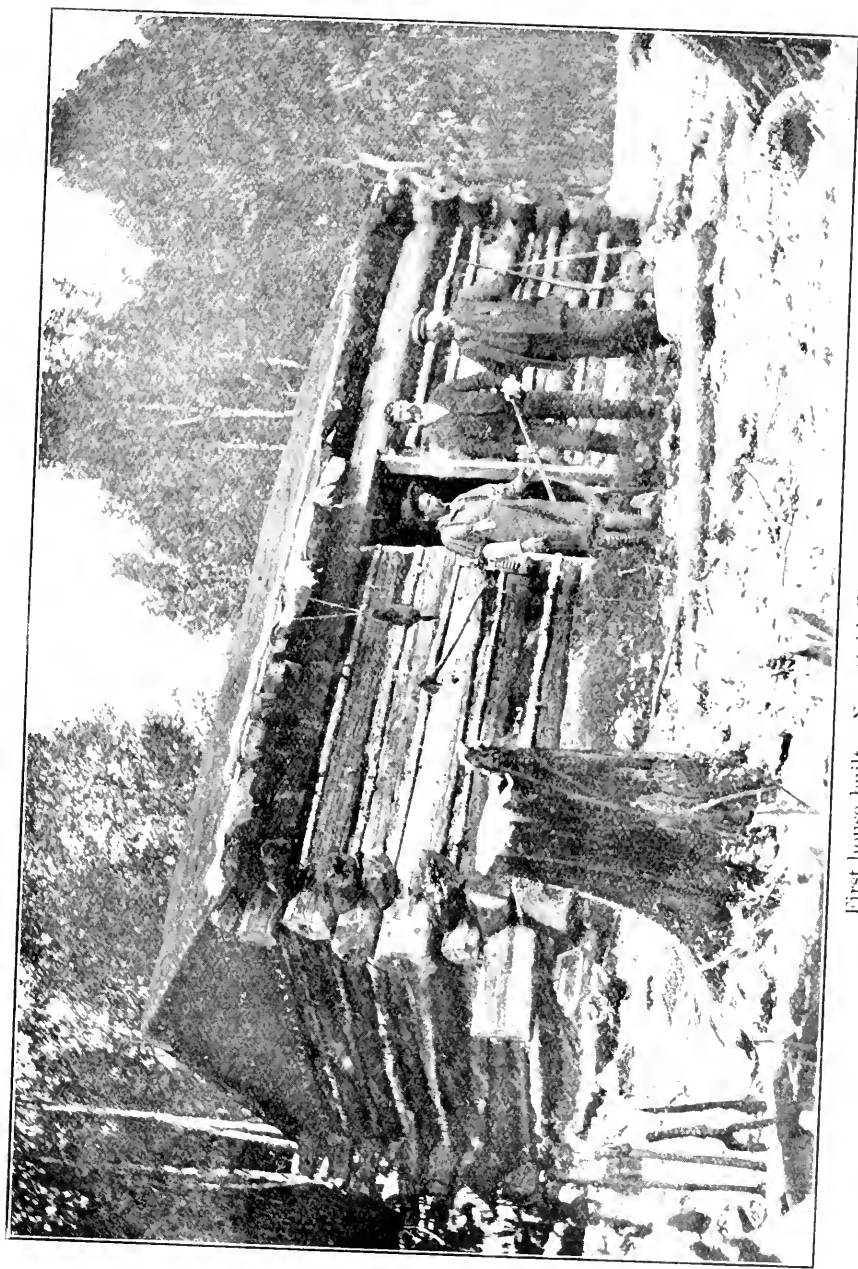
Shipping Mines.

	Jan.	Feb.	Mar.	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.	Total.
Bailey.....										30.00			30.00
Buffalo.....		20.05	51.50		177.95	100.75	170.35	52.80	99.40	100.00	110.00	80.00	992.80
Colonial.....		15.00											15.00
Collugas.....			30.00					55.80		135.00	120.00	81.22	422.02
Drummond.....				22.10		42.65			40.00			40.10	115.15
Foster.....										63.50	23.50	30.00	117.00
Green & Meehan.....											17.03		17.03
Kerr Lake.....	20.70		30.00				28.00		42.50			37.15	158.35
Larose.....	20.00	15.00	61.31		63.00	74.85	91.00	21.50	93.00	78.30	247.50	86.15	854.61
McKinley-Parragh.....		23.45					27.00			30.00			80.45
Niassaing.....		19.09	90.00	84.80	156.55	21.37	42.73	136.36	241.00	515.83	99.86	396.33	2,125.08
Nova Scotia.....	321.16						20.43				23.52		43.95
O'Brien.....												114.18	114.18
Right of Way.....												46.25	46.25
Silver Queen.....		6.40					30.00		97	92.98		30	130.94
Tredway.....									29.00	30.00			198.48
University.....	20.00	20.15	31.00	30.00					31.63	22.50	53.38	86.10	155.28
Violet.....									20.00				20.00
Totals.....	381.86	119.14	296.81	137.20	397.50	239.62	409.60	266.46	597.50	1,008.11	724.79	997.98	5,666.57

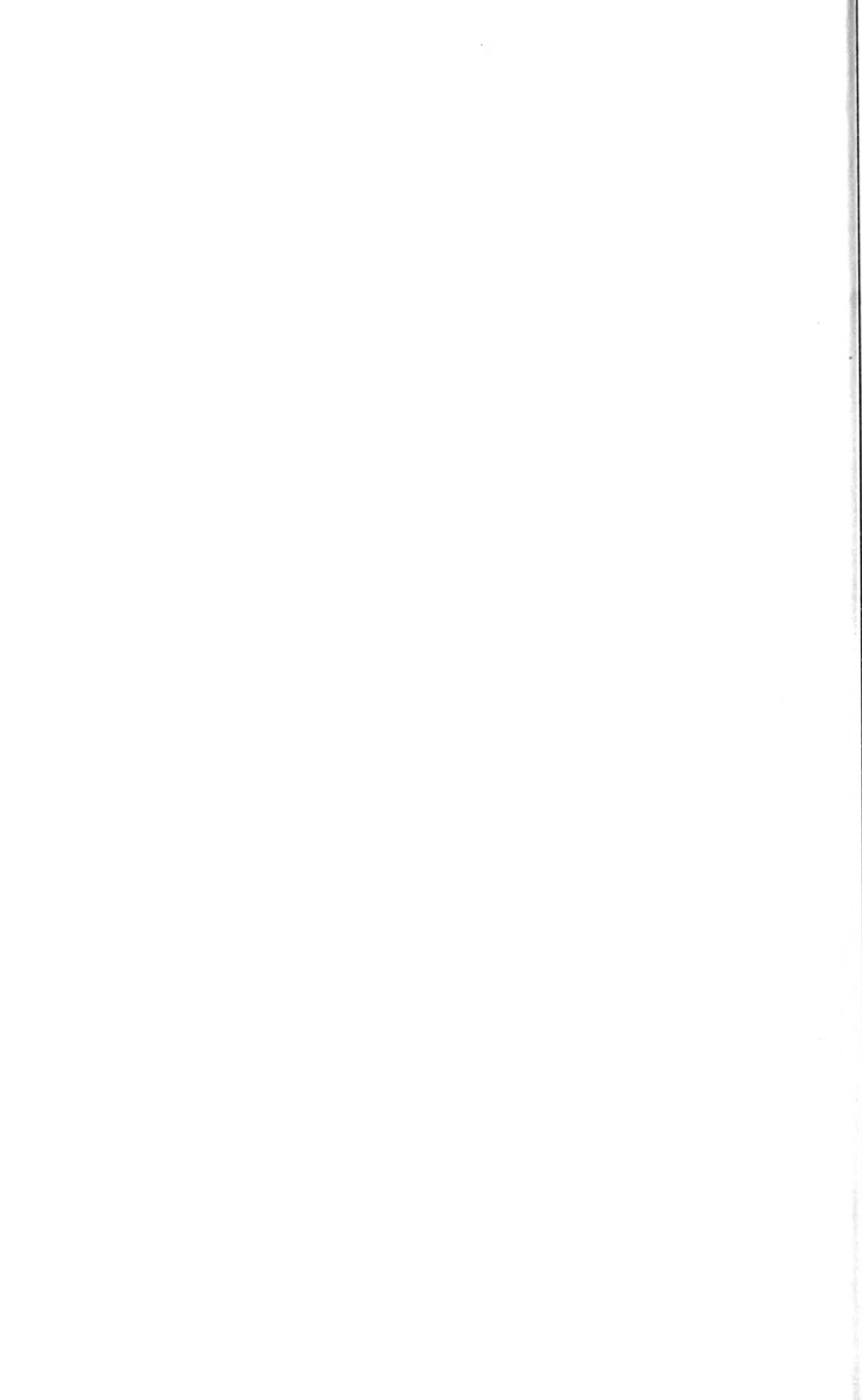


Waterfall below Long Lake.





First house built. New Gold Fields, Larder Lake.



REPORT OF B. FIELD, M.D., PHYSICIAN T. & N. O. RY, NEW LISKEARD, ONTARIO.

I beg to submit a report of the cases which received medical and hospital treatment during the year 1906:

I. Cases treated at the New Liskeard Ho pital.

Abscess.....	2	Discharged.
Bruises.....	2	"
Catarrh.....	1	"
Contused wounds.....	5	"
Dysentery.....	1	"
Fractures.....	2	One discharged.
Peritonitis.....	1	Discharged.
Pleurisy.....	1	"
Pneumonia.....	7	"
Rheumatism.....	3	"
Typhoid.....	15	"

II. Cases treated in Hospital on Construction.

Cuts and bruises.....	1	Discharged.
Dislocation of hip.....	1	"
Dysentery.....	2	One patient died.
Eczema.....	1	Discharged.
Pneumonia.....	3	"
Rheumatism.....	2	"
Typhoid.....	3	"

I am glad to report that only one death resulted from above diseases, and am also pleased to state that there has been a marked decrease in the number of cases of typhoid fever as compared with the preceding year; in fact the camps taken as a whole have been remarkably healthy.

The number of amputations were two. One man had leg amputated at thigh. The other had leg amputated about the knee. Both did well. The number of deaths from accidents were three amongst railway employees.

REPORT OF A. M. McMURCHY, M.D., PHYSICIAN T. & N. O. RY., NORTH BAY, ONTARIO.

I have to report that the health of the employees during the past year has been exceptionally good and that no fatal accidents have occurred.

The following is a list of accidents :—

1 Contusion of hip and sides.....	Recovered.
1 " ankle.....	"
1 " back of neck.....	"
1 " ankle.....	"
1 " arm and thigh.....	"
1 crushed index finger—amputated.....	"
1 concussion of brain.....	"
1 left leg crushed above ankle, amputated.....	"
1 lacerated palm of hand.....	"
1 " scalp wound.....	"
1 lacerated finger.....	"
1 " wound of scalp and forehead with fracture of skull.....	"
1 fractured arm and ribs.....	"
1 contusion back of hip.....	"

There were eight cases of typhoid fever with one death

One man died of acute rheumatism and endocarditis.

Among the families of employees there were several cases of typhoid fever, bronchitis, broncho-pneumonia and gastro-enteritis among the younger children, but there were no deaths.

CONTRACTS, AGREEMENTS, ETC.

PASSENGER CARS.

Articles of Agreement made in duplicate this ninth day of March, 1906, between the Crossen Car Manufacturing Company Limited, hereinafter called the Contractor, and the Temiskaming and Northern Ontario Railway Commission, hereinafter called the Commission. Witnesseth:—

1. In this contract the word "Inspector" shall mean the Inspector for the time being appointed by the Commission to represent and act for the Commission in the supervision of the construction and in the inspection and certification of the baggage and express cars hereinafter referred to.

2. The Contractor will supply and provide all and every kind of work, labor, materials, articles and things whatsoever for the due construction and completion and will well and duly build and complete in a perfect and workmanlike manner two baggage and express cars with all necessary appliances for use on the line of railway of the Commission in strict compliance with the specifications hereunto annexed, and with the plans and drawings relating thereto (save and except that the Westinghouse automatic quick action air brake apparatus in said specifications mentioned shall be furnished by the Commission subject to the said cars being properly equipped therewith by the contractor) to the complete satisfaction of the inspector and the contractor will deliver the said baggage and express cars completed to the Commission free on the railway tracks of the Commission, at the Town of North Bay on or before the 15th day of October, 1906, time being agreed to be material and of the essence of this contract, and in default of such delivery within the time aforesaid the contractor will pay to the Commission by way of liquidated damages the sum of ten dollars in respect of each car for each day which shall elapse after the date aforesaid before delivery of said cars respectively, which sums the Commission is authorized to deduct from the purchase price hereinafter mentioned.

3. The contractor shall furnish and deliver to the Commission at Toronto, without extra charge, four complete sets of blue prints of all detail plans of said baggage and express cars, and until delivery of such blue prints the contractor shall not be deemed for the purpose of this contract to have delivered said baggage and express cars or to be entitled to payment therefor.

4. The Inspector shall be the sole judge of all work and material done and supplied under this contract, and his decision on all questions in dispute with regard to any such work or material shall be final and the whole work shall be executed to his satisfaction as evidenced by his certificate in writing, which certificate shall be a condition precedent to the right of the contractor to be paid therefor.

5. The Inspector, and all persons from time to time authorized by him in that behalf, shall have free entry and access to the works of the contractor at all times while this contract is being performed, and shall have all reasonable facilities afforded to him and his representatives as aforesaid to satisfy him that the same is being carried out and performed in accordance with this contract.

6. The acceptance and payment for one of said baggage and express cars shall not be considered as any waiver of the obligations of the contractor with reference to the other.

7. This contract shall not be considered as fully complete until the guarantee clause in the attached specifications respecting wheels, springs, axles, centres, tires, etc., has been fully complied with. The books or other records of the Commission shall be taken as final and conclusive evidence in respect of all matters mentioned in said guarantee.

8. The Commission in consideration of the premises covenants with the contractor that the contractor from time to time and in all respects having fulfilled and performed the provisions of this contract (except the fulfillment of the guarantee which is to continue as aforesaid) on the contractor's part intended to be fulfilled and performed, will be paid for and in respect of each of said baggage and express cars the sum of five thousand two hundred and seventy-five dollars, payments to be made within thirty days after the delivery of each baggage and express car.

In witness whereof the parties have caused these presents to be executed under their respective corporate seals and under the hands of the proper officers in that behalf.

Signed, sealed and delivered
in presence of

HERBERT BOGGS.

A. J. McGEE.

THE CROSSEN CAR MANUFACTURING Co.,
OF COBOURG, LIMITED,
(Seal)

(Sgd.) WM. J. CROSSEN,
General Manager.

THE TEMISKAMING AND NORTHERN ONTARIO
RAILWAY COMMISSION,
(Seal)

C. B. SMITH,
Chairman.
H. W. PEARSON,
Secretary-Treasurer.

Articles of Agreement made in duplicate this ninth day of March, 1906, between the Crossen Car Manufacturing Company Limited, hereinafter called the Contractor, and the Temiskaming and Northern Ontario Railway Commission, hereinafter called the Commission. Witnesseth:—

1. In this contract the word "Inspector" shall mean the Inspector for the time being appointed by the Commission to represent and act for the Commission in the supervision of the construction and in the inspection and certification of the passenger coaches hereinafter referred to.

2. The Contractor will supply and provide all and every kind of work, labor, materials, articles and things whatsoever for the due construction and completion and will well and duly build and complete in a perfect and workmanlike manner four first class passenger coaches with all necessary appliances for use on the line of railway of the Commission in strict compliance with the specifications hereunto annexed, and with the plans and drawings relating thereto (save and except that the Westinghouse automatic quick action air brake apparatus in said specifications mentioned shall be furnished by the Commission subject to the said cars being properly equipped therewith by the contractor) to the complete satisfaction of the inspector and the contractor, will deliver the said passenger coaches completed to the Commission free on the railway tracks of the Commission, at the Town of North Bay on or before the 15th day of October, 1906,

time being agreed to be material and of the essence of this contract, and in default of such delivery within the time aforesaid the contractor will pay to the Commission by way of liquidated damages the sum of ten dollars in respect of each coach for each day which may elapse after the date aforesaid before delivery of said coaches respectively, which sums the Commission is authorized to deduct from the purchase price hereinafter mentioned.

3. The contractor shall furnish and deliver to the Commission at Toronto, without extra charge, four complete sets of blue prints of all detail plans of said passenger coaches, and until delivery of such blue prints the contractor shall not be deemed for the purposes of this contract to have delivered said passenger coaches or to be entitled to payment therefor.

4. The Inspector shall be the sole judge of all work and material done and supplied under this contract, and his decision on all questions in dispute with regard to any such work or material shall be final and the whole work shall be executed to his satisfaction as evidenced by his certificate in writing, which certificate shall be a condition precedent to the right of the contractor to be paid therefor.

5. The Inspector, and all persons from time to time authorized by him in that behalf, shall have free entry and access to the works of the contractor at all times while this contract is being performed, and shall have all reasonable facilities afforded to him and his representatives as aforesaid to satisfy him that the same is being carried out and performed in accordance with this contract.

6. The acceptance and payment for one or more of said passenger coaches shall not be considered as any waiver of the obligations of the contractor with reference to the others.

7. This contract shall not be considered as fully complete until the guarantee clause in the attached specifications respecting wheels, springs, axles, centres, tires, etc., has been fully complied with. The books or other records of the Commission shall be taken as final and conclusive evidence in respect of all matters mentioned in said guarantee.

8. The Commission in consideration of the premises covenants with the contractor that the contractor from time to time and in all respects having fulfilled and performed the provisions of this contract (except the fulfillment of the guarantee which is to continue as aforesaid) on the contractor's part intended to be fulfilled and performed, will be paid for and in respect of each of said passenger coaches the sum of nine thousand eight hundred and eighty-five dollars, payments to be made within thirty days after the delivery of each passenger coach.

In witness whereof the parties have caused these presents to be executed under their respective corporate seals and under the hands of the proper officers in that behalf.

Signed, sealed and delivered
in the presence of

HERBERT BOGGS,

A. J. MCGEE.

THE CROSSEN CAR MANUFACTURING Co.,
OF COBOURG, LIMITED,

(Seal)

(Sgd.) WM. J. CROSSEN,
General Manager.

THE TEMISKAMING AND NORTHERN ONTARIO
RAILWAY COMMISSION,

(Seal)

C. B. SMITH,
Chairman.

H. W. PEARSON,
Secretary-Treasurer.

Articles of agreement made in duplicate this fourteenth day of May, A.D. 1906, between the Crossen Car Manufacturing Co., Limited, hereinafter called the Contractor, and the Temiskaming and Northern Ontario Railway Commission, hereinafter called the Commission. Witnesseth:—

1. In this contract the word "Inspector" shall mean the Inspector for the time being appointed by the Commission to represent and act for the Commission in the supervision of the construction and in the inspection and certification of the baggage and express cars herein referred to.

2. The Contractor will supply and provide all and every kind of work, labor, materials, articles and things whatsoever for the due construction and completion and will well and duly build and complete in a perfect and workmanlike manner two baggage and express cars with all necessary appliances for use on the line of railway of the Commission in strict compliance with the specifications hereto annexed, and with the plans and drawings relating thereto (save and except that the Westinghouse automatic quick action air brake apparatus in said specifications mentioned shall be furnished by the Commission subject to the said cars being properly equipped therewith by the contractor) to the complete satisfaction of the inspector and the contractor, will deliver the said baggage and express cars completed to the Commission free on the railway tracks of the Commission, at the Town of North Bay, on or before the first day of October, 1906, time being agreed to be material and of the essence of this contract, and in default of such delivery within the time aforesaid the contractor will pay to the Commission by way of liquidated damages the sum of ten dollars in respect of each car for each day which may elapse after the date aforesaid before delivery of such cars respectively, which sums the Commission is authorized to deduct from the purchase price hereinafter mentioned.

3. The contractor shall furnish and deliver to the Commission at Toronto, without extra charge, two complete sets of blue prints of all detail plans of said baggage and express cars, and until delivery of such blue prints the contractor shall not be deemed for the purpose of this contract to have delivered said baggage and express cars or to be entitled to payment therefor.

4. The Inspector shall be the sole judge of all work and material done and supplied under this contract, and his decision on all questions in dispute with regard to any such work or material shall be final and the whole work shall be executed to his satisfaction as evidenced by his certificate in writing, which certificate shall be a condition precedent to the right of the contractor to be paid therefor.

5. The Inspector, and all persons from time to time authorized by him in that behalf, shall have free entry and access to the works of the contractor at all times while this contract is being performed, and shall have all reasonable facilities afforded to him and his representatives as aforesaid to satisfy him that same is being carried out and performed in accordance with this contract.

6. The acceptance and payment for one of said baggage and express cars shall not be considered as any waiver of the obligation of the contractor with reference to the other.

7. This contract shall not be considered as fully complete until the guarantee clause in the attached specifications respecting wheels, springs, axles, centres, tires, etc., has been fully complied with. The books or other records of the Commission shall be taken as final and conclusive evidence in respect of all matters mentioned in said guarantee.

8. The Commission in consideration of the premises covenants with the contractor that the contractor from time to time and in all respects having fulfilled and performed the provisions of this contract (except the fulfillment of the guarantee which is to continue as aforesaid) on the contractor's part intended to be fulfilled and performed, will be paid for and in respect of each of said baggage and express cars the sum of five thousand three hundred and fifty-five dollars, payments to be made within thirty days after the delivery of each baggage and express car.

In witness whereof the parties have caused these presents to be executed under their respective corporate seals and under the hands of the proper officers in that behalf.

Signed, sealed and delivered
in the presence of

(Sgd.) HERBERT BOGGS

(Sgd.) E. C. SETTELL.

THE CROSSEN CAR MANUFACTURING CO.,
OF COBOURG, LIMITED, (Seal)

(Sgd.) WM. J. CROSSEN,
General Manager.

THE TEMISKAMING AND NORTHERN ONTARIO
RAILWAY COMMISSION, (Seal)

C. B. SMITH,
Chairman.

H. W. PEARSON,
Secretary-Treasurer.

Articles of Agreement made in duplicate this sixth day of June, A.D. 1906, between the Crossen Car Manufacturing Company, Limited, hereinafter called the Contractor, and the Temiskaming and Northern Ontario Railway Commission, hereinafter called the Commission. Witnesseth:—

1. In this contract the word "Inspector" shall mean the Inspector for the time being appointed by the Commission to represent and act for the Commission in the supervision of the construction and in the inspection and certification of the first class passenger coaches hereinafter referred to.

2. The Contractor will supply and provide all and every kind of work, labor, materials, articles and things whatsoever for the due construction and completion and will well and duly build and complete in a perfect and workmanlike manner four first class passenger coaches with all necessary appliances for use on the line of railway of the Commission in strict compliance with the specifications hereunto annexed, and with the plans and drawings relating thereto (save and except that the Westinghouse automatic quick action air brake apparatus in said specifications mentioned shall be furnished by the Commission subject to the said coaches being properly equipped therewith by the contractor) to the complete satisfaction of the inspector and the contractor, will deliver the said passenger coaches completed to the Commission free on the railway tracks of the Commission, at the Town of North Bay, on or before the first day of February, 1907, time being agreed to be material and of the essence of this contract, and in default of such delivery within the time aforesaid the contractor will pay to the Commission by way of liquidated damages the sum of ten dollars

in respect of each coach for each day which shall elapse after the date aforesaid before the delivery of such coaches respectively, which sums the Commission is authorized to deduct from the purchase price hereinafter mentioned.

3. The contractor shall furnish and deliver to the Commission at Toronto, without extra charge, a complete set of blue prints of all detail plans of said passenger coaches, and until delivery of such blue prints the contractor shall not be deemed for the purpose of this contract to have delivered said coaches, or to be entitled to payment therefor.

4. The Inspector shall be the sole judge of all work and material done and supplied under this contract, and his decision on all questions in dispute with regard to any such work or material shall be final and the whole work shall be executed to his satisfaction as evidenced by his certificate in writing, which certificate shall be a condition precedent to the right of the contractor to be paid therefor.

5. The Inspector, and all persons from time to time authorized by him in that behalf, shall have free entry and access to the works of the contractor at all times while this contract is being performed, and shall have all reasonable facilities afforded to him and his representatives as aforesaid to satisfy him that same is being carried out and performed in accordance with this contract.

6. The acceptance and payment for one or more of said coaches shall not be considered as any waiver of the obligations of the contractor with reference to the others.

7. This contract shall not be considered as fully completed until all guarantees in the attached specifications have been fully complied with. The books or other records of the Commission shall be taken as final and conclusive evidence in respect of all matters mentioned in said guarantee.

8. The Commission in consideration of the premises covenants with the contractor that the contractor from time to time and at all times having fulfilled and performed the provisions of this contract (except the fulfillment of the guarantee which are to continue as aforesaid) on the contractor's part intended to be fulfilled and performed, will be paid for and in respect of each of the said coaches the sum of ten thousand dollars, payments to be made within thirty days after delivery of each coach.

In witness whereof the parties have caused these presents to be executed under their respective corporate seals and under the hands of the proper officers in that behalf.

THE CROSSEN CAR MANUFACTURING CO.,
OF COBOURG, LIMITED.

(Seal)

(Sgd.) WM. J. CROSSEN,
General Manager.

THE TEMISKAMING AND NORTHERN ONTARIO
RAILWAY COMMISSION.

(Seal)

C. B. SMITH,
Chairman.
H. W. PEARSON,
Secretary-Treasurer.

Articles of Agreement made in duplicate this twelfth day of June, A.D. 1906, between Rhodes, Curry & Company, hereinafter called the Contractor, and The Temiskaming and Northern Ontario Railway Commission, hereinafter called the Commission. Witnesseth:

1. In this contract the word "Inspector" shall mean the Inspector for the time being appointed by the Commission to represent and act for the Commission in the supervision of the construction and in the inspection and certification of the cars hereinafter referred to.

2. The Contractor will supply and provide all and every kind of work, labor, materials, articles and things whatsoever for the due construction and completion and will well and duly build and complete in a perfect and workmanlike manner five workmen's cars with all necessary appliances for use on the line of railway of the Commission in strict compliance with the specifications hereto annexed and with the plans and drawings relating thereto (save and except that the Westinghouse automatic quick action air brake apparatus mentioned in said specifications shall be furnished by the Commission, subject to the said cars being properly equipped therewith by the Contractor as provided for by the said specifications) to the complete satisfaction of the Inspector, and the said Contractor will deliver the said cars duly completed to the Commission free on the railway tracks of the Commission at the Town of North Bay, as follows: one of said cars on or before the 31st day of October, 1906; another of said cars on or before the 30th day of November, 1906; another of said cars on or before the 31st day of December, 1906, and the remaining two of said cars on or before the 31st day of January, 1907; time being agreed to be material and of the essence of this contract, and in default of such delivery within the time aforesaid the Contractor shall pay to the Commission by way of liquidated damages the sum of ten dollars in respect of each car for each day which may elapse after the dates aforesaid before delivery of said cars respectively, which sums the Commission authorized to deduct from the purchase price hereinafter mentioned, provided however, that such damages shall not be recoverable in respect of any delays occasioned by strikes, accidents, delays of other carriers or other delays which are unavoidable or beyond the control of the Contractor.

3. The Contractor shall furnish and deliver to the Commission at Toronto, without extra charge, two complete sets of blue prints of all detail plans of said cars and until delivery of such blue prints the Contractor shall not be deemed for the purpose of this contract to have delivered said cars or be entitled to payment therefor.

4. The Inspector shall be the sole judge of all work and material done and supplied under this contract, and his decision on all questions in dispute with regard to any such work or material shall be final and the whole work shall be executed to his satisfaction as evidenced by his certificate in writing, which certificate shall be a condition precedent to the right of the Contractor to be paid therefor.

5. The Inspector and all persons from time to time authorized by him on that behalf shall have free entry and access to the works of the Contractor at all times while this contract is being performed and shall have reasonable facilities afforded to him and his representatives as aforesaid to satisfy them that the same is being carried out and performed in accordance with this contract.

6. The acceptance and payment of one or more of said cars by the Commission shall not be considered as any waiver of the obligations of the Contractor with reference to the other.

7. This contract shall not be considered as fully completed until the guarantee clause in the attached specifications have been fully complied with. The books kept in the office of the Mechanical Superintendent of the Commission shall be taken as final and conclusive evidence as to all matters referred to in said guarantees.

8. The Commission, in consideration of the premises, covenants with the Contractor that the Contractor, from time to time and at all times having fulfilled and performed the provisions of this contract (except the fulfilment of the guarantees which are to continue as shewn in said specifications) on the Contractor's part intended to be fulfilled and performed, will be paid for and in respect of each of the said workmen's cars the sum of six thousand five hundred dollars, payments to be made within thirty days after delivery of each car.

In witness whereof the said parties have caused these presents to be executed under their respective corporate seals and under the hands of the proper officers in that behalf.

WITNESS :

(Sgd.) HELEN V. HUMPHREY.

(Sgd.) N. CURRY,

President.

(Sgd.) J. M. CURRY,

Secretary-Treasurer.

THE TEMISKAMING AND NORTHERN
ONTARIO RAILWAY
COMMISSION.

(Seal.)

(Sgd.) H. F. McDONALD.

(Sgd.) C. B. SMITH,

Chairman.

(Sgd.) H. W. PEARSON,

Secretary-Treasurer.

CONDUCTORS' VANS.

Articles of Agreement made in duplicate this twelfth day of March, A.D. 1906, between Rhodes, Curry & Company, Limited, hereinafter called the Contractor, and The Temiskaming and Northern Ontario Railway Commission, hereinafter called the Commission. Witnesseth:

1. In this contract the word "Inspector" shall mean the Inspector for the time being appointed by the Commission to represent and act for the Commission in the supervision of the construction and in the inspection and certification of the conductors' vans hereinafter referred to.

2. The Contractor will supply and provide all and every kind of work labor, materials, articles and things whatsoever for the due construction and completion, and will well and duly build and complete in a perfect and workmanlike manner two conductors' vans with all necessary appliances for use on the line of railway of the Commission in strict compliance with the specifications hereto annexed and with the plans and drawings relating thereto (save and except that the Westinghouse automatic quick action air brake apparatus mentioned in said specifications shall be furnished by the Commission subject to the said cars being properly equipped therewith by the Contractor as provided for by said specifications) to the complete satisfaction of the Inspector, and the said Contractor will deliver the said conductors' vans duly completed to the Commission free on the railway tracks of the Commission at the Town of North Bay on or before

the last day of June, 1906, time being agreed to be material and of the essence of this contract, and in default of such delivery within the time aforesaid the Contractor shall pay to the Commission by way of liquidated damages the sum of ten dollars in respect of each van for each day which may elapse after the date aforesaid before delivery of said vans respectively which sums the commission is authorized to deduct from the purchase price hereinafter mentioned, provided however that such damages shall not be recoverable in respect of any delays occasioned by strikes, accidents, delays of other carriers or other delays which are unavoidable or beyond the control of the Contractor.

3. The Inspector shall be the sole judge of all work and material done and supplied under this contract, and his decision on all questions in dispute with regard to any such work or material shall be final and the whole work shall be executed to his satisfaction as evidenced by his certificate in writing, which certificate shall be a condition precedent to the right of the Contractor to be paid therefor.

4. The Inspector and all persons from time to time authorized by him in that behalf shall have free entry and access to the works of the Contractor at all times while this contract is being performed, and shall have all reasonable facilities afforded to him and his representatives as aforesaid to satisfy them that the same is being carried out and performed in accordance with this contract.

5. The acceptance and payment of one of the said vans by the Commission shall not be considered as any waiver of the obligations of the Contractor with reference to the other.

6. This contract shall not be considered as fully completed until the guarantee clauses in the attached specifications respecting wheels, springs, axles, etc., have been fully complied with. The books kept in the office of the Mechanical Superintendent of the Commission shall be taken as final and conclusive evidence of the time the said wheels, springs, axles, etc., have lasted in service.

7. The Commission, in consideration of the premises, covenants with the Contractor that the Contractor, from time to time and in all respects having fulfilled and performed the provisions of this contract (except the fulfilment of the guarantee which is to continue as shewn in the said specifications) on the Contractor's part intended to be fulfilled and performed will be paid for and in respect of each of the said conductors' vans the sum of fourteen hundred and fifty dollars, payments to be made within thirty days after the delivery of each van.

In witness whereof the said parties have caused these presents to be executed under their respective corporate seals and under the hands of the proper officers in that behalf.

Signed, sealed and delivered
in the presence of:

V. G. CURRY.

H. F. MACDONALD.

RHODES, CURRY & Co., LIMITED.
(Seal.)

(Sgd.) N. A. RHODES,
Vice-President.

(Sgd.) J. M. CURRY,
Secretary-Treasurer.

THE TEMISKAMING AND NORTHERN
ONTARIO RAILWAY COMMISSION.
(Seal.)

(Sgd.) C. B. SMITH,
Chairman.

(Sgd.) H. W. PEARSON,
Secretary-Treasurer.

Articles of Agreement made in duplicate this eighteenth day of September, in the year of our Lord one thousand nine hundred and six, between The Rathbun Company, hereinafter called the Contractor, and The Temiskaming and Northern Ontario Railway Commission, hereinafter called the Commission. Witnesseth:

1. In this contract the word "Inspector" shall mean the Inspector for the time being appointed by the Commission to act for the Commission in the supervision of the construction and in the inspection and certification of the conductors' vans hereinafter referred to.

2. The Contractor will supply and provide all and every kind of work, labor, materials, articles and things whatsoever for the due construction and completion and will well and duly build and complete in a perfect and workmanlike manner four conductors' vans with all necessary appliances for use on the line of railway of the Commission in strict compliance with the specifications hereto annexed and with the plans and drawings relating thereto (save and except that the Westinghouse automatic quick action air brake apparatus mentioned in said specifications shall be furnished by the Commission subject to the said vans being duly equipped therewith by the Contractor as provided for by said specifications) to the complete satisfaction of the Inspector, and the Contractor will deliver the said conductors' vans duly completed to the Commission free on the railway tracks of the Commission at the Town of North Bay on or before the first day of December, 1906, time being agreed to be material and of the essence of this contract, and in default of such delivery within the time aforesaid, the Contractor shall pay to the Commission by way of liquidated damages the sum of ten dollars in respect of each van for each day which may elapse after the date aforesaid before delivery of said vans respectively, which sums the Commission is authorized to deduct from the purchase price hereinafter mentioned. Provided however that such damages shall not be recoverable in respect of any delays occasioned by strikes, accidents, delays of other carriers or other delays which are unavoidable or beyond the control of the Contractor.

3. The Inspector shall be the sole judge of all work and material done and supplied under this contract, and his decision on all questions in dispute with regard to any such work or material shall be final and the whole work shall be executed to his satisfaction as evidenced by his certificate in writing which certificate shall be a condition precedent to the right of the Contractor to be paid therefor.

4. The Inspector and all persons from time to time authorized by him in that behalf shall have free entry and access to the works of the Contractor at all times while this contract is being performed and shall have all reasonable facilities afforded to him and his representatives as aforesaid to satisfy them that the same is being carried out and performed in accordance with this contract.

5. The acceptance of and payment for one or more of said vans by the Commission shall not be considered as any waiver of the obligations of the Contractor with reference to the others.

6. This contract shall not be considered as fully completed until the guarantee clauses in the attached specifications respecting wheels, springs, axles, etc., have been fully complied with. The books kept in the office of the Mechanical Superintendent of the Commission shall be taken as final and conclusive evidence of the time the said wheels, springs, axles, etc., have lasted in service.

7. The Commission in consideration of the premises, covenants with the Contractor that the Contractor from time to time and in all respects having fulfilled and performed the provisions of this contract (except the fulfilment of the gaurantee which is to continue as shewn in the said specifications) on the Contractor's part intended to be fulfilled and performed will be paid for and in respect of each of the said conductors' vans the sum of twelve hundred and fifty dollars, payments to be made within thirty days after the delivery of each van.

In witness whereof the said parties have caused these presents to be executed under their respective corporate seals and under the hands of the proper officers in that behalf.

Signed, sealed and delivered
in the presence of:

FRANK F. T. HALL.

E. C. SETTELL.

THE RATHBUN COMPANY.

(Seal.)

(Sgd.) C. A. MILLENER,

Secretary-Treasurer.

THE TEMISKAMING AND NORTHERN
ONTARIO RAILWAY COMMISSION.

(Seal.)

(Sgd.) C. B. SMITH,

Chairman.

(Sgd.) H. W. PEARSON,

Secretary-Treasurer.

FLAT CARS.

Articles of Agreement made in duplicate this 26th day of March, A.D. 1906, between Rhodes, Curry & Company, Limited, hereinafter called the Contractor, and The Temiskaming and Northern Ontario Railway Commission, hereinafter called the Commission. Witnesseth:—

1. In this contract the word "Inspector" shall mean the Inspector for the time being appointed by the Commission to represent and act for the Commission in the supervision of the construction and in the inspection and certification of the platform cars hereinafter referred to.

2. The Contractor will supply and provide all and every kind of work, labor, material, articles and things whatsoever for the due construction and completion and will well and duly build and complete in a perfect and workmanlike manner twenty-five platform cars with all necessary appliances for use on the line of railway of the Commission in strict compliance with the specifications hereto annexed, and with the plans and drawings relating thereto, to the complete satisfaction of the Inspector, and the said Contractor will deliver the said platform cars duly completed to the Commission free on the railway tracks of the Commission at the town of North Bay on or before the 10th day of June, 1906, time being agreed to be material and of the essence of this contract, and in default of such delivery within the time aforesaid, the Contractor shall pay to the Commission, by way of liquidated damages, the sum of ten dollars in respect of each platform ear for each day which may elapse after the date aforesaid before delivery of the said cars respectively, which sums the Commission is authorized to deduct from the purchase price hereinafter mentioned, provided, however, that such damages shall not be recoverable in respect of any delays occasioned by strikes, accidents, delays of carriers or other delays which are unavoidable or beyond the control of the Contractor.

3. The Inspector shall be the sole judge of all work and material done and supplied under this contract, and his decision on all questions in dispute with regard to any such work or material shall be final, and the whole work shall be executed to his satisfaction as evidenced by his certificate in writing, which certificate shall be a condition precedent to the right of the Contractor to be paid therefor.

4. The Inspector and all persons from time to time authorized by him in that behalf shall have free entry and access to the works of the Contractor at all times while this contract is being performed, and shall have all reasonable facilities afforded to him and his representatives as aforesaid to satisfy them that the same is being carried out and performed in accordance with this contract.

5. The acceptance of and payment for one or more of the said cars by the Commission shall not be considered as any waiver of the obligations of the Contractor with reference to the others.

6. This contract shall not be considered as fully completed until the guarantee clauses in the attached specifications respecting springs, axles, etc., have been fully complied with. The books kept in the office of the Mechanical Superintendent of the Commission shall be taken as final and conclusive evidence of the time the said springs, axles, etc., have lasted in service.

7. The Commission in consideration of the premises covenants with the Contractor that the Contractor from time to time and in all respects having fulfilled and performed the provisions of this contract (except the fulfilment of the guarantee which is to continue as shown in the said specifications) on the Contractor's part intended to be fulfilled and performed, shall be paid for and in respect of each of the said platform cars so delivered as aforesaid the sum of six hundred and ninety-five dollars cash, payments to be made within thirty days after the delivery of each car, provided, and it is hereby understood and agreed that the said sum of six hundred and ninety-five dollars each for platform cars shall include an item of forty dollars for the estimated cost of transportation of each car to the railway tracks of the Commission at North Bay, and in the event of the Contractor being able to make arrangements by which any car may be loaded and transported to North Bay as aforesaid free of cost, or for any less cost than forty dollars, then the Commission shall receive the benefit of any such arrangement and the price to be paid the Contractor for every such car so transported free of cost or at a less cost than forty dollars shall be reduced accordingly.

In witness whereof the said parties have caused these presents to be executed under their corporate seals and under the hands of the proper officers in that behalf.

Signed, sealed and delivered
in the presence of

(Sgd.) V. G. CURRY.

(Sgd.) A. J. MCGEE.

RHODES, CURRY & Co.

(Seal).

(Sgd.) N. G. RHODES,

(Sgd.) J. M. CURRY,

THE TEMISKAMING AND NORTHERN
ONTARIO RAILWAY COMMISSION.

(Seal).

(Sgd.) C. B. SMITH,

Chairman.

(Sgd.) H. W. PEARSON,

Secretary-Treasurer.

Articles of Agreement made in duplicate the thirty-first day of October, in the year of our Lord one thousand nine hundred and six, between The Rathbun Company, hereinafter called the Contractor, and The Temiskaming and Northern Ontario Railway Commission, hereinafter called the Commission. Witnesseth:—

1. In this contract the word "Inspector" shall mean the Inspector for the time being appointed by the Commission to act for the Commission in the supervision of the construction and in the inspection and certification of the flat cars hereinafter referred to.

2. The Contractor will supply and provide all and every kind of work, labor, materials, articles and things whatsoever for the due construction and completion, and will well and duly build and complete in a perfect and workmanlike manner seventy-five flat cars with all necessary appliances for use on the line of railway of the Commission in strict compliance with the specifications hereto annexed and with plans and drawings relating thereto (save and except that the Westinghouse automatic quick action air brake apparatus mentioned in said specifications shall be furnished by the Commission, subject to the said cars being duly equipped therewith by the Contractor as provided for by said specifications) to the complete satisfaction of the Inspector, and the Contractor will deliver the said flat cars, duly completed, to the Commission free on the railway tracks of the Commission at the Town of North Bay on or before the thirty-first day of March, 1907, time being agreed to be material and of the essence of this contract, and in default of such delivery within the time aforesaid the Contractor shall pay to the Commission, by way of liquidated damages, the sum of five dollars in respect of each car for each day which may elapse after the date aforesaid before delivery of said cars respectively, which sums the Commission is authorized to deduct from the purchase price hereinafter mentioned. Provided, however, that such damages shall not be recoverable in respect of any delays occasioned by strikes, accidents, delays of other carriers, or other delays which are unavoidable or beyond the control of the Contractor.

3. The Inspector shall be the sole judge of all work and material done and supplied under this contract, and his decision on all questions in dispute with regard to any such work or material shall be final, and the whole work shall be executed to his satisfaction as evidenced by his certificate in writing, which certificate shall be a condition precedent to the right of the Contractor to be paid therefor.

4. The Inspector and all persons from time to time authorized by him in that behalf shall have free entry and access to the works of the Contractor at all times while this contract is being performed, and shall have all reasonable facilities afforded to him and his representatives as aforesaid to satisfy them that the same is being carried out and performed in accordance with this contract.

5. The acceptance of and payment for one or more of said cars by the Commission shall not be considered as any waiver of the obligations of the Contractor with reference to the others.

6. This contract shall not be considered as fully completed until the guarantee clauses in the attached specifications respecting wheels, springs, axles, etc., have been fully complied with. The books kept in the office of the Mechanical Superintendent of the Commission shall be taken as final and conclusive evidence of the time the said wheels, springs, axles, etc., have lasted in service.

7. The Commission in consideration of the premises covenants with the Contractor that the Contractor from time to time and in all respects having fulfilled and performed the provisions of this contract (except the fulfilment of the guarantee which is to continue as shown in the said specifications) on the Contractors' part intended to be fulfilled and performed, will be paid for and in respect of each of the said flat cars the sum of seven hundred and ten dollars, payments to be made within thirty days after the delivery of each car.

In witness whereof the said parties have caused these presents to be executed under their respective corporate seals and under the hands of the proper officers in that behalf.

Signed, sealed and delivered
in the presence of

FRANK T. HALL,

H. F. MACDONALD.
As to signatures of
J. L. Englehart and
H. W. Pearson.

THE RATHBUN COMPANY,

(Seal).

(Sgd.) C. WALTER RATHBUN,
General Manager.

(Sgd.) C. A. MILLENER,
Secretary-Treasurer.

THE TEMISKAMING AND NORTHERN
ONTARIO RAILWAY COMMISSION.

(Seal).

(Sgd.) J. L. ENGLEHART,
Chairman.

(Sgd.) H. W. PEARSON,
Secretary-Treasurer.

LOCOMOTIVES.

Articles of Agreement made this fifth day of March, in the year of our Lord one thousand nine hundred and six, between The Locomotive and Machine Company of Montreal, Limited, hereinafter called the Contractor, and The Temiskaming and Northern Ontario Railway Commission, hereinafter called the Commission. Witnesseth:—

1. In this contract the word "Inspector" shall mean the Inspector for the time being appointed by the Commission to represent and act for the Commission in the supervision of the construction and in the inspection and certification of the locomotive engines hereinafter referred to.

2. The Contractor will supply and provide all and every kind of work, labor, materials, articles and things whatsoever necessary for the due construction and completion and will well and duly build and complete in a perfect and workmanlike manner two ten-wheeled locomotive engines, with all necessary appliances, for use on the line of railway of the Commission in strict compliance with the specifications, all to be to the complete satisfaction of the Inspector and will in case elect to take same without super-heater under the provision in that behalf hereinafter contained deliver the same completed to the Commission free on the railway tracks of the Commission at North Bay, Ontario, before the 15th day of May, 1906, and in case the Commission shall not decide to dispense with super-heater as aforesaid, will deliver same completed to the Commission free on the railway tracks of the Commission at North Bay, before the 15th day of June, 1906, time being agreed to be material and of the essence of this contract;

and in default of such delivery within the times aforesaid, the Contractor shall pay to the Commission, by way of liquidated damages, the sum of twenty-five dollars in respect of each of said locomotive engines for each day, not exceeding fourteen days, which may elapse after the dates aforesaid before delivery of said locomotive engines respectively, and the sum of twenty-five dollars in respect of each locomotive engine for each day which may elapse after the expiration of such fourteen days before delivery of said locomotive engines respectively, which sums the Commission is authorized to deduct from the purchase price hereinafter mentioned. Provided, however, that such damages shall not be recoverable in respect of any delays caused wholly by strikes, fires, accidents, or other unavoidable occurrences wholly beyond the control of the Contractor.

3. The Contractor will furnish and deliver to the Commission, at Toronto, without extra charge, two complete sets of blue prints of all detailed plans of said locomotive engines, and until delivery of such blue prints the Contractor shall not be deemed for the purposes of this contract to have delivered said locomotive engines or be entitled to payment therefor.

4. The Inspector shall be the sole judge of all work and material done and supplied under this contract, and his decision on all questions in dispute with regard to any such work or material shall be final, and the whole work shall be executed to his satisfaction as evidenced by his certificate in writing, which certificate shall be a condition precedent to the right of the Contractor to be paid therefor.

5. The Inspector and all persons from time to time authorized by him in that behalf shall have free entry and access to the works of the Contractor at all times while this contract is being performed, and shall have all reasonable facilities afforded to him and his representatives as aforesaid to satisfy them that the same is being carried out and performed in accordance with this contract.

6. The acceptance and payment for one of said locomotive engines by the Commission shall not be considered as any waiver of the obligations of the Contractor with reference to the other.

7. Should the Commission decide upon steel frames in the construction of said locomotive engines, same shall be substituted by the Contractor without extra charge or deduction, and written notice by the secretary of the Commission addressed to the Contractor at Montreal and mailed in Toronto within five days from the date of this contract shall be sufficient notice of such decision, and should the Commission decide to dispense with the super-heater called for by said specifications, the same shall be dispensed with, and this contract and the specifications shall be read as if such super-heater were not called for by said specifications, and the price of said engines shall in that event be reduced one thousand dollars each, and written notice by the secretary of the Commission addressed to the Contractor at Montreal and mailed in Toronto within five days from the date of this contract shall be sufficient notice of such decision.

8. The Contractor guarantees all main parts such as boiler frames, wheels, axles, rods, crank pins, axle boxes, eccentrics, cylinders and connections not to show signs of defect or weakness within two years average service under fair usage, it being, however, understood and agreed between the parties that for the purposes of this contract construction service is not to be considered fair usage. The books kept in the office of the Mechanical

Superintendent of the Commission shall be taken as final and conclusive evidence of the time said wheels, springs, axles, etc., have lasted in service.

9. The Commission in consideration of the premises covenants with the Contractor that the Contractor from time to time and in all respects having fulfilled and performed the provisions of this contract (except the fulfilment of the guarantee which is to continue for two years) on the Contractor's part intended to be fulfilled and performed, shall be paid for said locomotive engines the sum of seventeen thousand four hundred and fifty dollars each, with super-heater, or sixteen thousand four hundred and fifty dollars each, without super-heater, within thirty days after delivery of the said locomotive engines as aforesaid.

In witness whereof the said parties have caused these presents to be executed under their respective corporate seals and under the hands of the proper officers in that behalf.

Signed, sealed and delivered
in the presence of

EUGENE WEST.

A. J. MCGEE.

THE LOCOMOTIVE & MACHINE CO. OF
MONTREAL, LIMITED.

(Seal).

(Sgd.) S. J. CALLAWAY,
Manager.

THE TEMISKAMING AND NORTHERN
ONTARIO RAILWAY COMMISSION.

(Seal).

(Sgd.) C. B. SMITH,
Chairman.

(Sgd.) H. W. PEARSON,
Secretary-Treasurer.

Articles of Agreement made this thirty-first day of March, in the year of our Lord one thousand nine hundred and six, between The Locomotive and Machine Co. of Montreal, Limited, hereinafter called the Contractor, and The Temiskaming and Northern Ontario Railway Commission, hereinafter called the Commission. Witnesseth:

1. In this contract the word "Inspector" shall mean the Inspector for the time being appointed by the Commission to represent and act for the Commission in the supervision of the construction, and in the inspection and certification of the locomotive engines hereinafter referred to.

2. The contractor will supply and provide all and every kind of work, labour materials, articles, and things whatsoever necessary for the due construction and completion, and will well and duly build and complete in a perfect and workmanlike manner two ten-wheeled locomotive engines with all necessary appliances for use on the line of railway of the Commission in strict compliance with the specifications and drawings annexed to a certain other contract between the parties hereto dated the fifth day of March, 1906, including seven revisions attached thereto, subject only to the following additional changes in such specifications:—

(A) Diamond "B" boiler tubes to be substituted for "Mannessman."

(B) "Midvale" engine tires 56 inches diameter to be substituted for those specified.

All to be to the complete satisfaction of the Inspector, and will deliver the same completed to the Commission free on the railway tracks of the Commission at North Bay, on or before the 15th day of June, 1906, time being agreed to be material and of the essence of this contract, and in default of such delivery within the time aforesaid, the contractor shall pay to the Commission by way of liquidated damages the sum of five dollars in respect of each of the said locomotive engines for each day not exceeding fourteen days, which may elapse after the date aforesaid before delivery of said locomotive engines respectively, and the sum of twenty-five dollars in respect of each locomotive engine for each day which may elapse after the expiration of such fourteen days before delivery of said locomotive engines respectively, which sums the Commission is authorized to deduct from the purchase price hereinafter mentioned; provided, however, that such damages shall not be recoverable in respect of any delays caused wholly by strikes, fires, accidents, or other unavoidable occurrences wholly beyond the control of the contractor.

3. The contractor will furnish and deliver to the Commission at Toronto without extra charge two complete sets of blue prints of all detail plans of said locomotive engines, and until delivery of such blue prints the contractor shall not be deemed for the purposes of this contract to have delivered said locomotive engines or be entitled to payment therefor.

4. The Inspector shall be the sole judge of all work and material done and supplied under this contract, and his decision on all questions in dispute with regard to any such work or material shall be final, and the whole work shall be executed to his satisfaction as evidenced by his certificate in writing, which certificate shall be a condition precedent to the right of the contractor to be paid therefor.

5. The Inspector and all persons from time to time authorized by him in that behalf shall have free entry and access to the works of the contractor at all times, while this contract is being performed, and shall have all reasonable facilities afforded to him and his representatives as aforesaid to satisfy them that the same is being carried out and performed in accordance with this contract.

6. The acceptance of and payment for one of said locomotive engines by the Commission shall not be considered as any waiver of the obligations of the contractor with reference to the other.

7. The contractor guarantees all main parts such as boiler frames, wheels, axles, rods, crank pins, axle boxes, eccentrics, cylinders and connections not to show signs of defect or weakness within two years average service under fair usage, it being however, understood and agreed between the parties that for the purposes of this contract construction service is not to be considered fair usage. The books kept in the office of the Mechanical Superintendent of the Commission shall be taken as final and conclusive evidence of the time said wheels, springs, axles, etc., have lasted in service.

8. The Commission in consideration of the premises covenants with the contractor, that the contractor from time to time and in all respects having fulfilled and performed the provisions of this contract (except the fulfilment of the guarantee which is to continue for two years) on the contractor's part intended to be fulfilled and performed shall be paid for said locomotive engines the sum of sixteen thousand four hundred and fifty dollars each, within thirty days after delivery of said locomotive engines as aforesaid.

In witness whereof the said parties have caused these presents to be executed under their respective corporate seals, and under the hands of the proper officers in that behalf.

Signed, sealed and delivered
in the presence of
(Sgd.) EUGENE WEST

THE LOCOMOTIVE AND MACHINE COMPANY,
OF MONTREAL.

(Sgd.) C. J. CALLAWAY,
Manager.

(Seal.)

(Sgd.) A. J. MCGEE.

THE TEMISKAMING AND NORTHERN ONTARIO
RAILWAY COMMISSION.

(Sgd.) C. B. SMITH,
Chairman.

(Sgd.) H. W. PEARSON,
Secretary-Treasurer.

(Seal.)

Articles of Agreement made in duplicate this thirty-first day of May, in the year of our Lord, 1906, between The Canadian Locomotive Company, Limited, hereinafter called the Contractor, and The Temiskaming and Northern Ontario Railway Commission, hereinafter called the Commission. Witnesseth:—

1. In this contract the word "Inspector" shall mean the Inspector for the time being, appointed by the Commission to represent and act for the Commission in the supervision of the construction, and in the inspection and certification of the switching locomotive engines hereinafter referred to.

2. The Contractor will supply and provide all and every kind of labor, work, materials, articles, and things whatsoever necessary for the due construction and completion, and will well and duly build and complete in a perfect and workmanlike manner two six-wheeled switching locomotive engines with all necessary appliances for use on the line of railway of the Commission in strict compliance with the specifications hereunto annexed, and to the complete satisfaction of the Inspector, and will deliver the same completed to the Commission free on the railway tracks of the Commission at North Bay, Ontario, as follows:—One of said switching locomotive engines on or before the 22nd day of October, 1906, and the other on or before the 29th day of October, 1906, time being agreed to be material and of the essence of this contract; and in default of such delivery within the time aforesaid the contractor shall pay to the Commission by way of liquidated damages the sum of five dollars in respect of each of the said switching locomotive engines for each day not exceeding fourteen days which may elapse after the dates aforesaid, before delivery of said switching locomotive engines respectively, and the sum of twenty-five dollars in respect of each switching locomotive engine for each day, which may elapse after the expiration of such fourteen days before delivery of said switching locomotive engines respectively, which sums the Commission is authorized to deduct from the price hereinafter mentioned; Provided, however, that such damages shall not be recoverable in respect of any delays caused wholly by strikes, fires, accidents, or other unavoidable occurrences wholly beyond the control of the Contractor.

3. The Contractor will furnish and deliver to the Commission at Toronto without extra charge, one complete set of blue prints of all detail plans of said switching locomotive engines, and until delivery of such blue

prints, the Contractor shall not be deemed for the purposes of this contract to have delivered said switching locomotive engines or be entitled to payment therefor.

4. The Inspector shall be the sole judge of all work and material done and supplied under this contract, and his decision on all questions in dispute with regard to any such work or material shall be final, and the whole work shall be executed to his satisfaction as evidenced by his certificate in writing which certificate shall be a condition precedent to the right of the contractor to be paid therefor; Provided, however, that in case the contractor shall be dissatisfied with the decision of the Inspector on any question in dispute, the Contractor shall on giving notice to the Secretary of the Commission within ten days from notice to the contractor of such decision having the right to appeal therefrom to the Superintendent of motive power of the Canadian Pacific Railway Company, and in case of any such appeal the decision of such Superintendent thereon shall be final and binding upon both parties. Any expense in connection with such appeal shall be borne by the contractor.

5. The Inspector and any person he deposes to represent him in his absence in that behalf shall have free entry and access to the works of the contractor at all times while this contract is being performed, and shall have all reasonable facilities afforded to him and his representative as aforesaid to satisfy them that the same is being carried out and performed in accordance with this contract.

6. The acceptance of and payment for one of said switching locomotive engines by the Commission shall not be considered as any waiver of the obligations of the contractor with reference to the other.

7. The contractor guarantees all main parts such as boiler, frames, wheels, axles, rods, crank pins, axles boxes, eccentrics, cylinders and connections not to show signs of defect or weakness within two years' average service under fair usage. The books kept in the office of the Mechanical Superintendent of the Commission shall be taken as final and conclusive evidence of the times said springs, wheels, axles, etc., have lasted in service.

8. The Commission in consideration of the premises covenants with the contractor that the contractor from time to time, and in all respects having fulfilled and performed the provisions of this contract (except the fulfillment of the guarantee which is to continue for two years), on the contractor's part intended to be fulfilled and performed shall be paid for said switching locomotive engines the sum of thirteen thousand six hundred and fifty-five (\$13,655.00) dollars, each within thirty days after delivery of said switching locomotive engines respectively, as aforesaid.

In witness whereof the said parties have caused these presents to be executed under their respective corporate seals, and under the hands of the proper officers in that behalf.

THE CANADIAN LOCOMOTIVE CO., LIMITED.
(Sgd.) C. BERMINGHAM,
Managing Director.

(Seal.)

THE TEMISKAMING AND NORTHERN
ONTARIO RAILWAY.

(Seal.)

(Sgd.) C. B. SMITH,
Chairman.

(Sgd.) H. W. PEARSON,
Secretary-Treasurer.

RAILS.

Memorandum of Agreement made this thirtieth day of November, A.D. 1906, between The Dominion Iron and Steel Company, Limited, hereinafter called the Contractor, and The Temiskaming and Northern Ontario Railway Commission, hereinafter called the Commission.

1. The contractor agrees to furnish and deliver to the Commission free of all charges on cars at North Bay as hereinafter specified, sixteen hundred tons of rails in strict compliance with the specifications hereto attached for the price of thirty-five dollars per gross ton of two thousand two hundred and forty pounds f. o. b. cars at North Bay.

2. Said rails shall be so delivered, one half thereof during the month of February, 1907, and the balance thereof during the month of March, 1907, time being agreed to be strictly of the essence of this contract.

3. In the event of stoppage or partial stoppage of the works of the contractor or shipments being delayed through strikes, accidents, breakage of machinery, or other causes beyond the contractor's control (of which the Commission shall be promptly notified), or in case of any shipments or any part thereof shall be lost in transit, the Contractor shall be entitled to such additional time in respect of the whole or part of such deliveries or either of them as the Chief Engineer of the Commission for the time being shall decide and certify in writing to be fair and reasonable, having reference to the character and duration of such stoppage, delay or loss, and such engineer shall be the sole and final judge as to the additional time to be allowed, and as to what part of such deliveries, or any of them same shall extend to, and his decision in every such case shall be absolutely final and binding upon both parties. The next preceding clause of these presents shall be construed so far as relates to any portion of such deliveries, or any of them affected by such extension of time as if the time fixed by the engineer were the time fixed in said clause.

4. The contractor shall give written notice to the Commission by letter addressed to the Secretary of the Commission, at the office of the Commission in Toronto, of the commencement of rolling at least fifteen days in advance of such commencement, and due notice of the resuming of rolling from time to time after the same shall have ceased.

5. The written certificate of the Inspector of the Commission provided for by said specifications certifying that the rails have been manufactured to his satisfaction in accordance with this contract, and the said specifications shall be a condition precedent to the right of the contractor to receive and be paid the price herein agreed to be paid for the same.

6. In case default shall be made by the contractor in the delivery of any of the said rails in accordance with the terms of this contract, and the continuance of such default for thirty days the Commission may cancel this contract, but the contractor shall nevertheless remain liable for all loss which may be suffered by the Commission by reason of the non-completion by the contractor of this contract; Provided, however, that credit shall be given to the contractor, notwithstanding such cancellation for the price of all rails which shall have been delivered by the contractor in accordance with this contract and the said specifications.

7. The cost of inspection provided for by the said specifications shall be borne by the Commission.

8. The contractor will from time to time replace free of charge, any rails supplied under this contract which shall break in use within a period of five years from the first day of February, 1907, provided such breakages are due to defective workmanship or materials of which the Chief Engineer of the Commission shall be the sole judge; and his decision shall be final and binding, the rails to replace such breakages to be delivered by the contractor to the Commission f. o. b. cars at North Bay yearly, within sixty days from the mailing to the contractor of the Superintendent's certificate hereinafter referred to on the certificate of the Superintendent for the time being of the railway Commission, certifying to the fact of such breakages, and the number of rails broken which certificate shall be final and binding on both parties in the premises.

9. The Commission in consideration of the premises promises to pay in Toronto, funds for each shipment of said rails upon the arrival thereof at North Bay, on presentation of invoices, and the certificate of the Inspector of the Commission attached to each draft; Provided this shall not require the Commission to pay for any rails at any earlier dates than the dates of delivery thereof required as aforesaid.

In witness whereof the said parties have caused these presents to be executed under their respective corporate seals, and the hands of the proper officers in that behalf.

Signed, sealed and delivered
in the presence of

J. P. McNAUGHTON.

A. J. McGEE.

DOMINION IRON & STEEL CO., LIMITED.
(Seal.)

(Sgd.) C. S. CAMERON,
Secretary.

TEMISKAMING & NORTHERN ONTARIO
RAILWAY COMMISSION.
(Seal.)

(Sgd.) J. L. ENGLEHART,
Chairman.

(Sgd.) H. W. PEARSON,
Secretary Treasurer.

TIES.

Memorandum of Agreement made in duplicate this 31st day of December, in the year of our Lord one thousand nine hundred and six, between John Cahill, of the Town of Bonfield, Contractor, hereinafter called the Contractor, and The Temiskaming and Northern Ontario Railway Commission, hereinafter called the Commission.

Witnesseth that in consideration of the mutual covenants and agreements hereinafter contained the parties hereby agree as follows:

1. The contractor will deliver to the Commission on the right of way of the Commission north of New Liskeard, one hundred and fifty thousand number one railway ties, and one hundred and twenty-five thousand number two railway ties with the option to the contractor to deliver not exceeding seventy-five thousand of the whole number of ties on such right of way south of New Liskeard, it being expressly agreed that fifty thousand out of the whole two hundred and seventy-five thousand ties shall be so delivered on the right of way between New Liskeard and Englehart, all

ties to be made from sound timber of good merchantable quality and in strict compliance in all respects with the specifications hereto annexed which specifications are hereby made a part of this contract; it being, however, agreed that should there in any respect be any discrepancy between the said specifications and these presents, then the terms of these presents shall govern said ties to be delivered and piled completely ready for inspection as follows; at least fifty thousand on or before the twenty-eighth day of February, 1907; at least an additional one hundred thousand on or before the thirtieth day of April, 1907; at least an additional fifty thousand on or before the thirtieth day of September, 1907, and the balance on or before the thirty-first day of December, 1907, it being expressly agreed that the fifty thousand ties to be delivered between New Liskeard and Englehart shall be included in the first two deliveries aforesaid, time being agreed to be material and of the essence of this contract, and it being further expressly agreed that the contractor shall have the option to substitute sawn ties instead of hewn ties called for by the specifications to an amount not exceeding fifty thousand ties in all divided between number one ties and number two ties as desired by the contractor.

2. The contractor will pay in cash for all ties purchased by him from other parties, and will not directly or indirectly contract for ties for said work the price of which shall be payable either wholly or partly in goods or otherwise than in actual cash.

3. The contractor will furnish satisfactory evidence to the engineer from time to time as requested by the engineer of his having complied with the provisions of the last preceding clause hereof, and as to the land upon which all ties delivered from time to time have been cut, and that the contractor or other party cutting same had the legal right to cut such ties and dispose of them, and that the same are free from all liens and attachments and until such evidence to the satisfaction of the engineer is furnished and until ties from time to time are actually accepted and marked by the engineer, or by his agent in that behalf as aforesaid the same shall be at the risk of the contractor.

4. The decision of the engineer or his agent in that behalf as to whether the ties conform to and are delivered in accordance with the terms of this contract shall be final and conclusive. Culled ties must be promptly removed from the railway right of way unless same shall be accepted by the engineer under clause five of such specifications in which case they shall be paid for at half price.

5. Government dues, if any, shall be paid by the Commission.

6. If the contractor shall become bankrupt or insolvent, or shall make an assignment for the benefit of his creditors, or shall compound with his creditors or propose any composition to his creditors for the settlement of his debts, or shall attempt to transfer, sublet or assign this contract or any part thereof without the consent in writing of the engineer, or if by the report of the engineer it shall appear that the rate of progress of the said work in the opinion of the engineer is not such as to ensure the completion of same within the time prescribed, or in case the said work has not been completed within the time limited, or if the contractor shall in the opinion of the engineer (who shall be the sole and absolute judge in that behalf), persist in any course violating the provisions of this contract, the Commission shall have the power and right at its discretion without previous notice and without process of law to take the work or any part thereof out of the hands of the contractor, and either re-let the same to any other person or persons with or without previous advertisement or to employ work-

men, and to provide materials, tools, and other necessary things at the expense of the contractor, or to take such other steps as the said Commission may consider necessary in order to secure the completion of the said work, and in any such case the contractor shall have no claim to any payment in respect of work performed, but all things done and means employed under this clause by the Commission shall be as binding on the contractor as if the things done and means employed had been done and employed by him under this contract; but the contractor shall nevertheless remain liable for all loss and damages which may be suffered by the Commission by reason of the non-completion by the contractor of the work, or by reason of any of the matters aforesaid which damages shall be deemed to include all salaries or wages which shall be payable to the person or persons superintending the work on behalf of the Commission, and no action or claim shall be raised or made by the contractor by reason or on account of the ultimate cost of the work so taken over, providing greater than in the opinion of the contractor it should be and the amount of all such loss and damages shall be computed and ascertained by the engineer whose certificate certifying to the amount thereof shall be final and binding upon all parties, but notwithstanding any of the matters aforesaid the contractor shall receive credit for all amounts owing to him for the part of the work which he shall have performed subject, however to the right of the Commission to deduct therefrom all such loss and damages as aforesaid as certified by the engineer.

7. Cash payments equal to about 90% of the value of the ties so delivered and accepted shall be made to the contractor monthly on the written certificate of the engineer that such ties have been so delivered and accepted, and such evidence furnished as aforesaid, and the said certificate shall be a condition precedent to the right of the contractor to be paid the said ninety per cent. or any part thereof; the remaining ten per cent. shall be retained until the final completion of the whole work to the satisfaction of the engineer, and until the engineer shall be satisfied that all wages of all workmen, labourers and servants of the said contractor, and of all sub-contractors under him as well as the price of all ties purchased by the contractor from other parties have been duly paid, whereupon the engineer shall give his final certificate accordingly, and such remaining ten per cent. of the balance payable to the contractor as found by the engineer shall be paid to him by the Commission within forty days after the granting of such final certificate; and it is hereby declared that the written certificate of the engineer certifying to the final completion of this contract as aforesaid shall be a condition precedent to the right of the contractor to receive or be paid the said remaining ten per cent. or any part thereof.

8. Should the contractor not complete the work notwithstanding any delay or hindrance by the Commission to the satisfaction of the engineer on or before the dates aforesaid, he shall at the option of the Commission in lieu of liability to pay damages and expenses as hereinbefore provided pay to the Commission by way of liquidated damages the sum of twenty dollars for each day that shall elapse after the respective dates or substituted dates as aforesaid before the whole work shall be completely executed to the satisfaction of the engineer.

9. The contractor shall not in any way without the consent in writing of the engineer first having been obtained to dispose of, assign, sublet or relet the work embraced in this contract or any portion thereof.

10. The Commission in consideration of the premises hereby covenants with the contractor that the contractor from time to time, and in all

respects having fulfilled the covenants and agreements herein contained, and on the contractor's part intended to be fulfilled will be paid on the terms aforesaid for each and every number one tie delivered and accepted as above the sum of thirty-five cents, and for each number two tie delivered and accepted as above the sum of thirty cents.

11. The word "Contractor" wherever it appears in this contract shall be deemed to include not only the contractor but his executors and administrators, and the word "Engineer" shall mean the Chief Engineer for the time being appointed by the Commission and having control of the work or construction of the Commission's line of railway.

In testimony whereof this agreement has been duly signed, sealed and executed by the said contractor, and duly executed by the said Commission under its corporate seal, and the hands of its Chairman and Secretary.

Signed, sealed and delivered	(Sgd.) JOHN CAHILL.	
in the presence of		(Seal.)
As to the signature of	THE TEMISKAMING & NORTHERN ONTARIO	
John Cahill,	RAILWAY COMMISSION.	
H. F. MACDONALD as to the		(Seal.)
FRANK SAUNDERS,	(Sgd.) J. L. ENGLEHART,	
signatures of	Chairman	
J. L. Englehart and	(Sgd.) A. J. MCGEE,	
A. J. McGee.	Secretary.	

ROUND HOUSE AND MACHINE SHOPS, NORTH BAY AND ENGLEHART.

Articles of Agreement made in duplicate this eighteenth day of June, in the year of our Lord one thousand nine hundred and six, between Benjamin Versher Hole, of the City of London, Ontario, carrying on business under the name and style of Forest City Paving Co., hereinafter called the Contractor, and the Temiskaming and Northern Ontario Railway Commission, hereinafter called the Commission. Witnesseth:—

1. In this contract the word "work" or "works" shall, unless the context requires a different meaning, mean the whole of the work, materials, matters and things required to be done, furnished and performed under this contract. The word "Engineer" shall mean the Chief Engineer for the time being appointed by the Commission and having control over the work.

2. The Contractor will at his own expense provide all and every kind of work, labor, materials, articles and things whatsoever for the due construction and completion and will well and duly erect and complete in a perfect and workmanlike manner roundhouse and machine shops at North Bay Junction and Englehart for use by the Commission in connection with its line of railway in strict compliance with the specifications hereto annexed and with the plans and drawings relating thereto to the complete satisfaction of the Engineer on or before the 15th day of September, 1906, or within such extended time as shall on the written application of the Contractor be fixed in writing by the Engineer, time being agreed to be material and of the essence of the contract.

3. The Contractor shall forthwith commence the work and shall proceed diligently therewith at the rate required by the Engineer and shall complete

the work including extras and alterations and notwithstanding any delay or hindrance by the Commission to the satisfaction of the Engineer within the time aforesaid.

4. The Engineer shall be at liberty at any time either before the commencement or during the construction of the work or any portion thereof to order any extra work to be done and to make any changes which he may deem expedient in the nature, location or position of the works or any part or parts thereof or any other things connected with the work whether or not such changes increase or diminish the work to be done or the cost of doing the same, and the Contractor shall immediately comply with all requisitions of the Engineer in that behalf and shall commence and complete the work so ordered to be done within the time specified by the Engineer, but the Contractor shall not make any change in or addition to or omission or deviation from the work and shall not be entitled to any payment for any change, addition, deviation or extra work unless such change, addition, omission, deviation or extra work shall have been first directed in writing by the Engineer and notified to the Contractor, and the decision of the Engineer as to whether any such change or deviation increases or diminishes the work and as to the allowance to be made to the Contractor or deducted from the Contractor in respect of any increase or diminution shall be final and all the provisions of this contract shall apply to any changes, additions, deviations or extra work in like manner and to the same extent as to the work tendered for, and no changes, additions, deviations or extra work shall annul or invalidate this contract and no compensation shall be claimable by the Contractor for any loss of anticipated profits or otherwise in respect of or in consequence of any change or deviation in or omission from the work.

5. The Engineer shall be the sole judge of the work and material in respect of both quantity and quality and his decision on all matters in dispute in regard to work and material shall be final, and no works or extra or additional works or changes shall be deemed to have been executed nor shall the Contractor be entitled to payment for the same unless the same shall have been directed in writing as hereinbefore provided and executed to the satisfaction of the Engineer as evidenced by his certificate in writing, which certificate shall be a condition precedent to the right of the Contractor to be paid therefor.

6. The Contractor shall be at the risk of and shall bear all loss or damage whatsoever which may occur to the works or any of them until the same be fully and finally completed and delivered up to and accepted by the Commission, and if any loss or damage occur before such final completion, delivery and acceptance the Contractor shall immediately at his own expense repair, restore and re-execute the work so damaged so that the whole works or the respective parts thereof may be completed within the time hereby limited.

7. The Commission in consideration of the premises covenants with the Contractor that the Contractor from time to time and in all respects having fulfilled and performed the provisions of this contract on the contractor's part intended to be fulfilled and performed will be paid for said work the price set out in the tender of the Contractor, copy of which is hereto attached as follows: Ninety per cent. of the Engineer's interim estimates of the value of the work done monthly on the Engineer's progress certificates and the balance on the Engineer's final certificate, such balance to be paid within forty days after the date of such final certificate.

8. It is distinctly agreed that no implied contract of any kind whatsoever by or on behalf of the Commission shall arise or be implied from anything contained in these presents, including the said specifications and plans and drawings and the tender of the Contractor for said work or from any position or situation of the parties at any time, it being clearly understood and agreed that the express contracts covenants agreements and stipulations contained in these presents and in the said specifications, plans and drawings upon which any right against the Commission is to be founded, it being further expressly agreed that the said specifications and tender and these presents are to be read together, and that in case of any discrepancy between these presents and anything contained in such specifications and tender the provisions of these presents shall govern. In case of any discrepancy appearing at any time between the specifications, profile plans, drawings and detail drawings or any of them, the Contractor shall follow such one of them as the Engineer shall in writing direct.

In witness thereof this agreement has been duly signed, sealed and executed by the Contractor and duly executed by the said Commission under its corporate seal and the hands of its Chairman and Secretary.

Signed, sealed and delivered in the presence of	FOREST CITY PAVING Co.	(Seal)
JOHN J. GALPIN,	(Sgd.) B. V. HOLE, Manager.	
W. G. CHACE.	THE TEMISKAMING AND NORTHERN ONTARIO RAILWAY COMMISSION.	(Seal)
	(Sgd.) C. B. SMITH, Chairman.	
	(Sgd.) H. W. PEARSON, Secretary-Treasurer.	

TURNABLES, NORTH BAY AND ENGLEHART.

Articles of Agreement made in duplicate this thirty-first day of August, in the year of our Lord 1906, between the Locomotive and Machine Company of Montreal, Limited, hereinafter called the Contractor of the first part, and the Temiskaming and Northern Ontario Railway Commission, hereinafter called the Commission, of the second part.

1. In this contract the word "work" or "works" shall, unless the context requires a different meaning, mean the whole of the work, materials, matters and things required to be done, furnished and performed under this contract. The word "Engineer" shall mean the Chief Engineer for the time being appointed by the Commission and having control over the work, and the word "Inspector" shall mean the Inspector for the time being appointed by the Engineer to represent and act for the Engineer in the supervision of construction and in the inspection and certification of the work herein contracted for.
2. The contractor will at its own expense provide all and every kind of work, labor, materials, articles and things whatsoever for the due construc-

tion and completion, and will well and duly erect and complete in a perfect and workmanlike manner one forty-four foot girder span at North Bay Junction, and one seventy-five foot turn table at North Bay Junction, and one seventy-five foot turn table at Englehart for use by the Commission in connection with its line of railway in strict compliance with the specifications and the plans for the respective works hereto annexed, and to the complete satisfaction of the Engineer, or in his absence of the Inspector, as to material and workmanship of the construction and to the complete satisfaction of the Engineer as to erection and completion thereof, and will ship the same complete to the Commission on or before the twenty-fifth day of October, 1906, or on or before such later date as upon the written application of the contractor for an extension of time, the Engineer may in writing substitute, and the girder span to be erected within ten days after delivery of material at the site, time being deemed to be material and of the essence of this contract.

3. The Engineer, or in his absence the Inspector, shall be the sole judge of the material and workmanship used in the said construction, and his decision on all questions in dispute in regard to such material and workmanship shall be final, and the same shall be executed to his satisfaction as evidenced by his certificate in writing, and the Engineer shall be the sole judge of the erection and completion of the said work and his decision on all questions in dispute with regard to the same shall be final and the same shall be executed to his satisfaction as evidenced by his certificate in writing, which certificates by the Inspector and the Engineer shall be conditions precedent to the right of the contractor to be paid for said work.

4. The Engineer or his Inspector and all persons from time to time authorized by the Engineer on his behalf shall have free entry and access to all the works of the contractor at all times while this contract is being performed and shall have all necessary facilities afforded to him and his representatives as aforesaid to satisfy them that the same is being carried out and performed in accordance with this contract.

5. All materials, plant and tools required for or in connection with the said work shall be delivered by the contractor at North Bay, f. o. b. cars, but same and every workman of the contractor necessary for the erection of said construction shall be transported and conveyed by the Commission from North Bay to the site of the construction and return free of charge to the contractor.

6. Should the said work not be completed within the time hereinbefore limited the contractor shall forfeit and pay to the Commission as liquidated damages the sum of ten dollars per day for each of the three works hereby contracted for which may not be completed either as to delivery or erection within the time limited.

7. The Commission covenants with the Contractor upon the final completion of the works hereby contracted for and the production of the certificates of the Engineer as aforesaid to pay to the Contractor the sum of one thousand seven hundred and forty dollars for said girder span and three thousand one hundred and sixty dollars for each of said turn tables.

8. The Contractor shall be at the risk and shall bear all loss or damage whatsoever which may occur to the works or any of them until the same be fully and finally completed and delivered up to and accepted by the Commission, and if any loss or damage occurs before such final completion, delivery and acceptance the Contractor shall immediately at its own ex-

pense replace, restore, and re-execute the work so damaged so that the whole works or the respective parts thereof may be completed within the time hereby limited.

In witness whereof this agreement has been duly executed under the corporate seals of the respective parties and the hands of their proper officers.

Signed, sealed and delivered
in the presence of

THOS. L. FELL

E. C. SETTELL.

THE LOCOMOTIVE AND MACHINE CO.,
OF MONTREAL.

(Seal)

(Sgd.) JOHN LYLE HARRINGTON,
Chief Engineer.

THE TEMISKAMING AND NORTHERN ONTARIO
RAILWAY COMMISSION.

(Seal)

(Sgd.) C. B. SMITH,
Chairman.

(Sgd.) H. W. PEARSON,
Secretary-Treasurer.

HEATING OF ENGINE AND CAR SHOPS, NORTH BAY AND ENGLEHART.

Articles of Agreement made in duplicate this twenty-third day of July, in the year of our Lord one thousand nine hundred and six, between Sheldons, Limited, a Company duly organized and existing under the laws of the Dominion of Canada, having Head Office at the Town of Galt, hereinafter called the Contractor, and The Temiskaming and Northern Ontario Railway Commission, hereinafter called the Commission. Witnesseth:

1. In this contract the word "work" or "works" shall, unless the context requires a different meaning, mean the whole of the work, materials, matters and things required to be done, furnished and performed under this contract. The word "Engineer" shall mean the Chief Engineer for the time being appointed by the Commission and having control over the work.

2. The Contractor will, at its own expense, provide all and every kind of work, labor, materials, articles and things whatsoever for the due installing and construction of a hot air blast heating system, and will well and duly instal and complete in a perfect and workmanlike manner such hot air system for heating of the Commission's engine houses and machine shops at North Bay and Englehart, in strict compliance with the tender of the Contractor therefor (copy of which is hereto annexed) and with the plans and drawings relating thereto, to the complete satisfaction of the Engineer; the work to be promptly proceeded with as the work of construction of said engine houses and machine shops proceeds and so as not at any time to delay any part of such work of construction, time being agreed to be material and of the essence of this contract.

3. The Contractor shall forthwith commence the work upon the execution of these presents and shall proceed diligently therewith at the rate required by the Engineer and shall complete the work, including extras and alterations, and notwithstanding any delay or hindrance by the Commission, to the satisfaction of the Engineer within the time aforesaid.

4. The Engineer shall be at liberty at any time either before the commencement or during the construction of the work or any portion thereof to order any extra work to be done and to make any changes which he may deem expedient in the nature, location or position of the works or any part or parts thereof, or any other things connected with the work, whether or not such changes increase or diminish the work to be done or the cost of doing the same, and the Contractor shall immediately comply with all requisitions of the Engineer in that behalf and shall commence and complete the work so ordered to be done within the time specified by the Engineer, but the Contractor shall not make any change in or addition to or omission or deviation from the work and shall not be entitled to any payment for any change addition, deviation or extra work unless such change, addition, omission, deviation or extra work shall have been first directed in writing by the Engineer and notified to the Contractor and the decision of the Engineer as to whether any such change or deviation increases or diminishes the work and as to the allowance to be made to the Contractor or deducted from the Contractor in respect of any increase or diminution shall be final and all the provisions of this contract shall apply to any changes, additions, deviations or extra work in like manner and to the same extent as to the work tendered for and no changes, additions, deviations or extra work shall annul or invalidate this contract and no compensation shall be claimable by the Contractor for any loss of anticipated profits or otherwise in respect of or in consequence of any change or deviation in or omission from the work.

5. The Engineer shall be the sole judge of the work and materials in respect of both quantity and quality, and his decision on all matters in dispute in regard to work and materials shall be final and no works or extra or additional works or changes shall be deemed to have been executed nor shall the Contractor be entitled to payment for the same unless the same shall have been directed in writing as hereinbefore provided, and executed to the satisfaction of the Engineer as evidenced by his certificate in writing, which certificate shall be a condition precedent to the right of the Contractor to be paid therefor.

6. The Contractor shall be at the risk of and shall bear all loss or damage whatsoever which may occur to the works or any of them until the same shall be fully and finally completed and delivered up to and accepted by the Commission, and if any loss or damage occur before such final completion, delivery and acceptance, the Contractor shall immediately at its own expense repair, restore and execute the work so damaged so that the whole works or the respective parts thereof may be completed within the time hereby limited.

7. The Commission, in consideration of the premises, covenants with the Contractor that the Contractor from time to time and in all respects having fulfilled and performed the provisions of this contract on the Contractor's part intended to be fulfilled and performed, will be paid for said work on the certificates from time to time of the Engineer the price set out in the said tender, as follows: one-third thereof upon delivery of material upon the ground; one-third thereof upon completion of the work, and the balance thereof on the approval of the work by the Chief Engineer as evidenced by his final certificate in that behalf after the same shall have been tested during not less than thirty days of seasonable winter weather; it being, however, expressly agreed and understood that notwithstanding the giving of such final certificate the Contractor shall continue responsible upon the guarantees contained in said tender.

8. It is distinctly agreed that no implied contract of any kind whatsoever by or on behalf of the Commission shall arise or be implied from anything contained in these presents or in the said tender or from any position or situation of the parties at any time, it being clearly understood and agreed that the express contracts, covenants, agreements and stipulations contained in these presents and in the said tender are and shall be the only contracts, covenants, agreements and stipulations upon which any right against the Commission is to be founded.

In witness whereof the said parties have caused these presents to be executed under their respective corporate seals and under the hands of the proper officers in that behalf.

SHELDONS, LIMITED.

(Seal.)

(Sgd.) W. D. SHELDON,
President.

(Sgd.) J. O. STEWART,
Secretary.

THE TEMISKAMING AND NORTHERN
ONTARIO RAILWAY COMMISSION.

(Seal.)

(Sgd.) C. B. SMITH,
Chairman.

(Sgd.) H. W. PEARSON,
Secretary-Treasurer.

E. C. SETTELL,
as to execution by
C. B. Smith and
H. W. Pearson.

TRESTLES, COAL CHUTES, NORTH BAY AND ENGLEHART.

Articles of Agreement made in duplicate this twenty-second day of June, in the year of our Lord one thousand nine hundred and six, between John F. H. Wyse and Henry W. Middlemist, both of the City of Toronto, trading under the firm name of Wyse & Middlemist, hereinafter called the Contractors, and The Temiskaming and Northern Ontario Railway Commission hereinafter called the Commission. Witnesseth:

1. In this contract the word "work" or "works" shall, unless the context requires a different meaning, mean the whole of the work, materials, matters and things required to be done, furnished and performed under this contract. The word "Engineer" shall mean the Chief Engineer for the time being appointed by the Commission and having control over the work.

2. The Contractors will at their own expense provide all and every kind of work, labor, materials, articles and things whatsoever for the due construction and completion, and will well and duly erect and complete in a perfect and workmanlike manner the approaching trestles and coal chutes at North Bay and Englehart for use by the Commission in connection with its line of railway in strict compliance with the specifications hereto annexed and with the plans and drawings relating thereto to the complete satisfaction of the Engineer on or before the 15th day of September, 1906, or within such extended time as shall on the written application of the contractors be fixed in writing by the Engineer, time being agreed to be material and of the essence of the contract.

3. The Contractors shall forthwith commence the work and shall proceed diligently therewith at the rate required by the Engineer, and shall complete the work, including extras and alterations, and notwithstanding any delay or hindrance by the Commission to the satisfaction of the Engineer within the time aforesaid.

4. The Engineer shall be at liberty at any time either before the commencement or during the construction of the work, or any portion thereof, to order any extra work to be done and to make any changes which he may deem expedient in the nature, location or position of the works or any part or parts thereof, or any other things connected with the work whether or not such changes increase or diminish the work to be done or the cost of doing the same, and the Contractors shall immediately comply with all requisitions of the Engineer in that behalf and shall commence and complete the work so ordered to be done within the time specified by the Engineer, but the Contractors shall not make any change in or addition to or omission or deviation from the work and shall not be entitled to any payment for any change, addition, deviation or extra work unless such change, addition, omission, deviation or extra work shall have been first directed in writing by the Engineer and notified to the Contractors and the decision of the Engineer as to whether any such change or deviation increases or diminishes the work and as to the allowance to be made to the Contractors or deducted from the Contractors in respect of any increase or diminution shall be final and all the provisions of this contract shall apply to any changes, additions, deviations or extra work in like manner and to the same extent as to the work tendered for and no changes, additions, deviations or extra work shall annul or invalidate this contract and no compensation shall be claimable by the Contractors for any loss of anticipated profits or otherwise in respect of or in consequence of any change or deviation in or omission from the work.

5. The Engineer shall be the sole judge of the work and material in respect of both quantity and quality, and his decision on all matters in dispute in regard to work and material shall be final, and no works or extra or additional works or changes shall be deemed to have been executed nor shall the Contractors be entitled to payment for the same unless the same shall have been directed in writing as hereinbefore provided and executed to the satisfaction of the Engineer as evidenced by his certificate in writing, which certificate shall be a condition precedent to the right of the Contractors to be paid therefor.

6. The Contractors shall be at the risk of and shall bear all loss or damage whatsoever which may occur to the works or any of them until the same be fully and finally completed and delivered up to and accepted by the Commission, and if any loss or damage occur before such final completion, delivery and acceptance, the Contractors shall immediately, at their own expense, repair, restore and re-execute the work so damaged so that the whole works or the respective parts thereof may be completed within the time hereby limited.

7. The Commission, in consideration of the premises, covenants with the Contractors that the Contractors from time to time and in all respects having fulfilled and performed the provisions of this contract on the Contractors' part intended to be fulfilled and performed, will be paid for said work the price set out in the tender of the Contractors, a copy of which is hereto attached, as follows: ninety per cent. of the Engineer's interim estimates of the value of the work done monthly on the Engineer's progress certificates, and the balance on the Engineer's final certificate, such balance to be paid within forty days after the date of such final certificate.

8. It is distinctly agreed that no implied contract of any kind whatsoever by or on behalf of the Commission shall arise or be implied from anything contained in these presents, including the said specifications and plans and drawings and the tender of the Contractors for said work or from any position or situation of the parties at any time, it being clearly understood and agreed that the express contracts, covenants, agreements and stipulations contained in these presents and in the said specifications, plans and drawings are and shall be the only contracts, covenants, agreements and stipulations upon which any right against the Commission is to be founded, it being further expressly agreed that the said specifications and tender and these presents are to be read together and that in case of any discrepancy between these presents and anything contained in such specifications and tender, the provisions of these presents shall govern. In case of any discrepancy appearing at any time between the specifications, profiles, plans, drawings and detail drawings or any of them, the Contractors shall follow such one of them as the Engineer shall in writing direct.

In witness whereof this agreement has been duly signed, sealed and executed by the Contractors and duly executed by the said Commission under its corporate seal and the hands of its Chairman and Secretary.

Signed, sealed and delivered
in the presence of:

R. STUART D. HARTRICK.

A. J. MCGEE.

(Sgd.) J. F. H. WYSE,

(Seal).

(Sgd.) H. W. MIDDLEMIST.

(Seal).

THE TEMISKAMING AND NORTHERN
ONTARIO RAILWAY COMMISSION.

(Seal).

(Sgd.) C. B. SMITH,

Chairman.

(Sgd.) H. W. PEARSON,

Secretary-Treasurer.

HEATING OF STATIONS, ETC.

Memorandum of Agreement made in duplicate this fourteenth day of September, in the year of our Lord one thousand nine hundred and six, between Fred Armstrong & Co., Limited, a company duly organized under the Ontario Joint Stock Companies' Act, hereinafter called the Contractor, and the Temiskaming and Northern Ontario Railway Commission, hereinafter called the Commission. Witnesseth:—

1. In this contract the word "work" or "works" shall, unless the context requires a different meaning, mean the whole of the work, material, matters and things required to be done, furnished and performed under this contract. The word "Engineer" shall mean the Chief Engineer for the time being appointed by the Commission and having control over the work.

2. The Contractor will at its own expense provide all and every kind of work, labor, materials, articles and things whatsoever for the due construction and completion of the heating, plumbing and wiring of the Englehart station of the Commission, and for the heating of Uno Park and Earlton stations of the Commission for use by the Commission in connection

with its line of railway in strict compliance with the specifications hereto annexed and with the plans and drawings relating thereto to the complete satisfaction of the Engineer as to the heating, plumbing and wiring of Englehart station on or before the fifteenth day of November, 1906, and as to the heating of Uno Park and Earlton stations on or before the fifteenth day of October, 1906, or within such extended time as shall on the written application of the Contractor be fixed in writing by the Engineer, time being agreed to be material and of the essence of this contract.

3. The Contractor shall forthwith commence the work and shall proceed diligently therewith at the rate required by the Engineer, and shall complete the work, including extras and alterations, and notwithstanding any delay or hindrance by the Commission to the satisfaction of the Engineer within the time aforesaid.

4. The Engineer shall be at liberty at any time either before the commencement or during the construction of the work, or any portion thereof, to order any extra work to be done and to make any changes which he may deem expedient in the nature, location or position of the works, or any part or parts thereof, or any other things connected with the work, whether or not such changes increases or diminish the work to be done or the cost of doing the same, and the Contractor shall immediately comply with all requisitions of the Engineer in that behalf and shall commence and complete the work so ordered to be done within the time specified by the Engineer, but the Contractor shall not make any change in or addition to or omission or deviation from the work and shall not be entitled to any payment for any change, addition, deviation or extra work unless such change, addition, omission, deviation or extra work shall have been first directed in writing by the Engineer and notified to the Contractors, and the decision of the Engineer as to whether any such change or deviation increases or diminishes the work and as to the allowance to be made to the Contractor or deducted from the Contractor in respect of any increases or diminution shall be final, and all the provisions of this contract shall apply to any changes, additions, deviations or extra work in like manner and to the same extent as to the whole work tendered for, and no changes, additions, deviations or extra work shall annul or invalidate this contract, and no compensation shall be claimable by the Contractor for any loss of anticipated profit or otherwise in respect of or in consequence of any change or deviation in or omission from the work.

The Engineer shall be the sole judge of the work and material in respect of both quantity and quality, and his decision on all matters in dispute in regard to work and material shall be final, and no works or extra or additional works or changes shall be deemed to have been executed, nor shall the Contractor be entitled to payment for the same unless the same shall have been directed in writing as hereinbefore provided and executed to the satisfaction of the Engineer as evidenced by his certificate in writing, which certificate shall be a condition precedent to the right of the Contractor to be paid therefor.

6. The Contractor shall be at the risk of and shall bear all loss and damage whatsoever which may occur to the works or any of them until the same be fully and finally completed and delivered up to and accepted by the Commission, and if any loss or damage occur before such final completion, delivery and acceptance, the Contractor shall immediately at its own expense repair, restore and re-execute the work so damaged so that the whole works, or the respective parts thereof, may be completed within the time hereby limited.

7. The Commission in consideration of the premises covenants with the Contractor that the Contractor from time to time and in all respects having fulfilled and performed the provisions of this contract on the Contractor's part intended to be fulfilled and performed will be paid for the said work as to the heating, plumbing and wiring of Englehart station the sum of two thousand seven hundred dollars, as to the heating of Uno Park station the sum of three hundred and seventy-five dollars, as to the heating of Earleton station the sum of four hundred and sixty dollars, ninety per cent. of the Engineer's interim estimate of the value of the work done monthly on the Engineer's progress certificates, and the balance on the Engineer's final certificate, such balance to be paid within forty days after the date of such final certificate.

8. It is distinctly agreed that no implied contract of any kind whatsoever by or on behalf of the Commission shall arise or be implied from anything contained in these presents, including the said specifications and plans and drawings and the tender of the Contractor for said work, or from any position or situation of the parties at any time, it being clearly understood and agreed that the express contracts, covenants, agreements and stipulations contained in these presents and in the said specifications, plans and drawings are and shall be the only contracts, covenants, agreements and stipulations upon which any right against the Commission is to be founded, it being further expressly agreed that the said specifications and tender and these presents are to be read together, and that in case of any discrepancy between these presents and anything contained in such specifications and tender the provisions of these presents shall govern. In case of any discrepancy appearing at any time between the specifications, profiles, plans, drawings and detail drawings or any of them, the Contractor shall follow such one of them as the Engineer shall in writing direct.

In witness whereof this agreement has been duly executed by the parties under their respective corporate seals and the hands of the proper officers in that behalf.

Signed, sealed and delivered
in the presence of

(Sgd.) EMILY HART.

}	THE FRED. ARMSTRONG Co., LIMITED.	(Seal).
	(Sgd.) FRED. ARMSTRONG, President.	
	THE TEMISKAMING AND NORTHERN ONTARIO RAILWAY COMMISSION.	(Seal).
	(Sgd.) C. B. SMITH, Chairman.	
	(Sgd.) H. W. PEARSON, Secretary-Treasurer.	

TELEGRAPH AND TELEPHONE LINES.

Articles of Agreement made in duplicate this twenty-second day of June, in the year of our Lord one thousand nine hundred and six, between John F. H. Wyse and Henry W. Middlemist, both of the City of Toronto, trading under the firm name of Wyse & Middlemist, hereinafter called the Contractors, and The Temiskaming and Northern Ontario Railway Commission, hereinafter called the Commission. Witnesseth:--

1. In this contract the word "Engineer" shall mean the Chief Engineer for the time being of the Commission.

2. The Contractors will, at their own expense, provide all and every kind of work, labor, plant and equipment whatsoever for the due construction and completion, and will well and duly build and complete in a perfect and workmanlike manner a two wire telegraph line with poles one hundred and sixty feet centres on the line of the Commission from Englehart to McDougal's Chute with all necessary appliances for use by the Commission in connection with said railway in strict compliance with the specifications hereto annexed to the complete satisfaction of the Engineer, and will begin such construction work immediately at Englehart and will complete said telegraph line at the rate of twenty miles per month, reckoning from the date of this contract until the track-laying is overtaken, and thereafter will build same so as to keep up with the track-laying, time being agreed to be material and of the essence of this contract.

3. The Engineer shall be the sole judge of the work and his decision on all questions in dispute in regard to the work shall be final and the work shall not be deemed to have been executed nor shall the Contractor be entitled to payment for the same unless and until the same shall have been executed to the satisfaction of the Engineer, as evidenced by his certificate in writing, which certificate shall be a condition precedent to the right of the Contractors to be paid therefor.

4. The Contractors shall be at the risk of and shall bear all loss or damage whatsoever which may occur to the work, or any part thereof, until the same be fully and finally completed and delivered up to and accepted by the Commission, and if any such loss or damage occur before such final completion, delivery and acceptance, the Contractors shall immediately, at their own expense, repair and restore and re-execute the work so damaged so that the whole work may be completed within the time hereby limited.

5. The Commission in consideration of the premises covenants with the Contractors that the Contractors from time to time and in all respects having fulfilled and performed the provisions of this contract on the Contractors' part intended to be fulfilled and performed, will be paid for the said work the sum of six thousand seven hundred dollars as follows: Ninety per cent. of the Engineer's interim estimates of the value of the work monthly on the Engineer's certificate, and the balance on the Engineer's final certificate to be paid within forty days after the date of same.

6. It is distinctly agreed that no implied contract of any kind whatsoever by or on behalf of the Commission shall arise or be implied from anything contained in this contract, including the said specifications or the tender of the said Contractors for the work, or from any position or situation of the parties at any time, it being clearly understood and agreed that the express contracts, covenants, agreements and stipulations contained in these presents and in the said specifications are and shall be the only contracts, covenants agreements and stipulations upon which any right against the Commission is to be founded, it being further expressly agreed that the said specifications and these presents are to be read together, and that in case of any discrepancy between these presents and anything contained in such specifications, the provision of these presents shall govern.

In witness whereof this agreement has been duly signed, sealed and executed by the said Contractors and duly executed by the said Commission under its corporate seal and the hands of its Chairman and Secretary.

(Sgd.) R. STEWART D.
HARTRICK.

(Sgd.) J. F. H. WYSE.

(Seal.)

(Sgd.) H. W. MIDDLEMIST.

(Seal.)

THE TEMISKAMING AND NORTHERN
ONTARIO RAILWAY COMMISSION.

(Sgd.) A. J. MCGEE.

(Sgd.) C. B. SMITH.

Chairman.

(Sgd.) H. W. PEARSON,

Secretary-Treasurer.

(Seal.)

Articles of Agreement made in duplicate this twenty-second day of June, in the year of our Lord, one thousand nine hundred and six, between John F. H. Wyse and Henry W. Middlemist, both of the City of Toronto, trading under the firm name of Wyse & Middlemist, hereinafter called the Contractors, and The Temiskaming and Northern Ontario Railway Commission, hereinafter called the Commission. Witnesseth:—

1. In this contract the word "Work" or "Works" shall, unless the context requires a different meaning, mean the whole of the work, material, matters and things required to be done, furnished and performed under this contract. The word "Engineer" shall mean the Chief Engineer for the time being appointed by the Commission and having control over the work.

2. The contractors will at their own expense provide all and every kind of work and labour, and except where the annexed specifications show that same are to be supplied by the Commission will further provide and supply all materials, articles and things whatsoever for the due construction and completion, and will well and duly build, erect and complete in a perfect and workmanlike manner the long distance telephone and telegraph lines with all necessary appliances for use by the Commission in connection with its line of railway in strict compliance with the specifications hereto annexed, and with the plans and drawings relating thereto to the complete satisfaction of the engineer within twelve weeks next after the date of this contract or within such extended time as shall on the written application of the contractors be fixed in writing by the engineer, time being agreed to be material and of the essence of this contract.

3. The Contractor shall forthwith commence work and shall proceed diligently therewith at the rate required by the Engineer, and shall complete the work, including extras and alterations, and notwithstanding any delay or hindrance by the Commission to the satisfaction of the Engineer by the said date.

4. The Engineer shall be at liberty at any time either before the commencement or during the construction of the work, or any portion thereof, to order any extra work to be done and to make any changes which he may deem expedient in the nature, location or position of the works, or any part or parts thereof, or any other things connected with the work, whether or

not such changes increases or diminish the work to be done or the cost of doing the same, and the Contractor shall immediately comply with all requisitions of the Engineer in that behalf and shall commence and complete the work so ordered to be done within the time specified by the Engineer, but the Contractor shall not make any change in or addition to or omission or deviation from the work and shall not be entitled to any payment for any change, addition, deviation or extra work unless such change, addition, omission, deviation or extra work shall have been first directed in writing by the Engineer and notified to the Contractors, and the decision of the Engineer as to whether any such change or deviation increases or diminishes the work and as to the allowance to be made to the Contractors or deducted from the Contractors in respect of any increase or diminution shall be final, and all the provisions of this contract shall apply to any changes, additions, deviations or extra work in like manner and to the same extent as to the work tendered for, and no changes, additions, deviations or extra work shall annul or invalidate this contract, and it is expressly agreed that the work on the branch and telephone and telegraph lines to Haileybury and New Liskeard mentioned in said specifications shall not be proceeded with until directed by the engineer on behalf of the Commission, and that the Commission may if it sees fit dispense with the building of such branch telephone and telegraph lines to Haileybury and New Liskeard, and no compensation shall be claimable by the contractors for any loss of anticipated profits or otherwise in respect of or in consequence of any change or deviation in or omission from the work, or in consequence of the decision of the Commission not to construct the said branch telegraph and telephone lines to Haileybury and New Liskeard, or either of them.

5. The engineer shall be the sole judge of the work and material in respect of both quantity and quality, and his decision on all matters in dispute in regard to work and material shall be final, and no works or extra or additional works or changes shall be deemed to have been executed nor shall the contractors be entitled to payment for the same unless the same shall have been directed in writing as hereinbefore provided and executed to the satisfaction of the engineer as evidenced by his certificate in writing which certificate shall be a condition precedent to the right of the contractors to be paid therefor.

6. The contractors shall be at the risk of and shall bear all loss or damage whatsoever which may occur to the works or any of them until the same be fully and finally completed and delivered up to and accepted by the Commission, and if any such loss or damage occur before such final completion, delivery and acceptance the contractors shall immediately at their own expense repair, restore or re-execute the works so damaged so that the whole works or the respective parts thereof may be completed within the time hereby limited.

7. The Commission in consideration of the premises covenants with the contractors that the contractors from time to time and in all respects having fulfilled and performed the provisions of this contract on the Contractors' part intended to be fulfilled and performed will be paid for said work the prices set out in a tender of the contractors' copy of which is hereto attached as follows: Ninety per cent. of the engineer's interim estimates of the value of the work done monthly on the engineer's progress certificates, and the balance on the engineer's final certificate to be paid within forty days after the date of such final certificate.

8. It is distinctly agreed that no implied contract of any kind whatsoever by or on behalf of the Commission shall arise or be implied from anything contained in these presents, including the said specifications and plans and drawings and the tender of the said contractors for said work, or from any position or situation of the parties at any time, it being clearly understood and agreed that the express contracts, covenants, agreements and stipulations contained in these presents and in the said specifications, plans and drawings are and shall be the only contracts, covenants, agreements and stipulations upon which any right against the Commission is to be found; it being further expressly agreed that the said specifications and tender, and these presents are to be read together, and that in case of any discrepancy between these presents, and anything contained in such specifications or tender the provisions of these presents shall govern.

In witness whereof this agreement has been duly signed, sealed and executed by the Contractors and duly executed by the said Commission under its corporate seal and the hands of its Chairman and Secretary.

(Sgd.) R. STEWART D.
HARTRICK.

(Sgd.) J. F. H. WYSE.

(Seal).

(Sgd.) H. W. MIDDLEMIST.

(Seal).

THE TEMISKAMING AND NORTHERN
ONTARIO RAILWAY COMMISSION.

(Seal).

(Sgd.) A. J. MCGEE.

(Sgd.) C. B. SMITH,

Chairman.

(Sgd.) H. W. PEARSON,

Secretary-Treasurer.

EXTENSION AGREEMENT, 2ND CONTRACT.

This indenture made the twenty-ninth day of September, 1906, between Allan Ranald Macdonnell, of the City of Montreal, hereinafter called the Contractor, of the first part, the Honorable William Harty, of the City of Kingston, Manufacturer, and Thomas Long, of the City of Toronto, Merchant, hereinafter called the Sureties, of the second part, and the Temiskaming and Northern Ontario Railway Commission, hereinafter called the Commission, of the third part.

Whereas the contractor has applied to the Commission for an extension of time to complete the work called for by a certain contract between him and the said Commission, dated the 7th day of June, 1904, for the construction of the Commission's line of railway north of New Liskeard, a distance of 80 to 100 miles.

And whereas the said sureties are the sureties for the contractor for the due completion of said contract on the terms of their bond to the said Commission attached to the said contract and have joined with the contractor in such request for an extension of time.

And whereas the Commission has agreed to extend the time for the completion of the said work subject to the terms hereof.

Now these presents witness that the agreement between the parties in the premises is as follows:—

1. The thirtieth day of November, 1907, is hereby substituted for the 31st day of December, 1905 (the time fixed by said contract of the 7th day of June, 1904) as the time for the completion of the work called for by said contract of the 7th day of June, 1904.

2. The yard at New Liskeard, including the track and right of way to a point one half mile northward from the north switch of the "Y," shall be under the control of the Operating Department of the Commission and shall for the purpose of possession control and operation be henceforth deemed to be a portion of the track and right of way covered by the agreements between the parties relating to the line of railway of the Commission from North Bay to New Liskeard, but the Commission subject in all cases to the prior running rights of its own trains and engines will allow the contractor free of charge the right of access to and the use of the tracks that are now laid in connection with his roundhouses between the different legs of the "Y" at New Liskeard, and the Contractor shall be allowed and paid the cost as certified by the engineer of laying the tracks of the said "Y" at New Liskeard as part of the work under the said construction contract, but as to all other "Y's" north of New Liskeard, unless ordered by the engineer as part of the permanent construction, same shall be taken up by the contractor when they have served their purposes without any allowance or payment for laying or taking up, notwithstanding which the Commission shall have the free use of same in the meantime as occasion may arise.

3. The Commission shall on the first day of October, 1906, establish a regular train service on said line of railway up to and including Englehart without prejudice to its rights under the contract of 7th of June, 1904, as hereby amended and without such operating being deemed to be or constitute any acceptance of the said work or any part thereof as being completed as required by said contractor, and the contractor shall be bound to carry on and complete his work of construction of the line between New Liskeard and Englehart without interfering with the operation of the said line, and he and his servants and employees and his trains, engines and other equipments, and also all sub-contractors and their servants and employees and their trains, engines and other equipment shall in all respects be subject to the orders and directions of the officers, agents and servants of the Commission engaged in or connected with the operation of the said road and shall be bound to comply with and conform to all the orders, regulations and directions of the Commission and of its officers, agents and servants engaged in or connected with the operation of the said road, the true intent and meaning of these presents being that in consideration of such extension of time and of the other terms hereof the contractor shall complete, finish and fully do and execute the work called for by the said contract subject to the operation of the said road by the Commission up to and including Englehart, and without any interference with the operation thereof except such as shall be permitted or authorized by the Commission through its officers duly designated and accredited in that behalf, and until the Commission shall have established a regular train service as aforesaid it shall have the right at any time hereafter and from time to time to run such trains as it may find advisable on said line of railway up to and including Englehart without prejudice to its rights as aforesaid, provided, however, that until the establishment of a regular train service as aforesaid such running of trains by the Commission shall be subject to prior running rights of the contractor's construction trains.

4. The Commission shall further have the right from time to time to operate its trains free of charge over any portion of the said road which its

Chief Engineer shall consider fit for that purpose for the hauling of material and supplies required by the Commission or by any contractors with the Commission other than the said contractor (the party of the first part) for construction purposes, including not only purposes connected with the contract of the said contractor, but connected with the construction of stations, section houses, tanks, telegraph and telephone lines, and all other matters in connection with which the Commission or any other contractors as aforesaid shall or may require to transport any material or supplies without prejudice to the rights of the Commission under said construction contract as aforesaid but subject except as to the portion of said road up to and including Englehart Junction—after same shall be regularly operated by the Commission under the last preceding paragraph hereof—to prior running rights of the contractor's construction trains as aforesaid.

5. The contractor shall be entitled after the Commission shall have established a regular train service as aforesaid to run his engines and haul his rolling stock over the tracks of the Commission between Englehart and New Liskeard for the purpose of necessary repairs but for no other purpose, and to the use for his trains and engines of the track between Englehart and the contractor's camp at White River, and shall further be entitled to haul with his own power over the tracks of the Commission to North Bay such of his plant as he may from time to time send out as the work referred to in said second construction contract draws towards completion, all free of charge but subject to the prior running rights of the Commission's trains and to the train and other orders of the Commission's officers.

6. In settlement of disputes which have arisen as to the rate at which the contractor is entitled to be paid for material excavated by steam shovel from clay cuttings on the right of way and removed by train for trestle filling or otherwise, it is agreed that in respect of material excavated by steam shovel from cuttings about the 19th mile north of New Liskeard embraced between stations Numbers 1,555 and 456 on Section 2, known as Taylor's Creek Cuttings, and removed by train for trestle filling and in respect of material excavated by steam shovel at Swanston's Cuttings, about the 37th mile north of New Liskeard, embraced between Sections 344 and 368 on Section 4, and removed by train, whether used for trestle filling or wasted, there shall be allowed to the contractor and paid by the Commission the sum of 63 cents per cubic yard, being the amount of the contractor's tender for excavation and for trestle filling combined; and subject to the allowance so to be made on the certificate of the engineer as required by said construction contract, it is agreed that the contractor shall be entitled to be paid for material excavated by steam shovel from clay cuttings on the right of way up to any width directed by the Engineer and removed by train running on permanent tracks according to the classification of material in the cuttings but without any allowance for overhaul, and in the case of material borrowed to fill trestles and removed by train the contractor shall be entitled to be paid according to the appropriate classification of material, but without any allowance for overhaul.

7. The location of the line of railway from the 93rd to the 100th mile north of New Liskeard having been changed after certain work had been done thereon, it is now agreed that the contractor shall perform under and as part of the work called for by the said construction contract of the 7th of June, 1904, and at the prices fixed by said contract, the construction work from the 93rd to the 100th mile north of New Liskeard as aforesaid as shown on the plans and profiles to be furnished him by the Commission's Engineer and shall take back from the said Engineer such of the supplies and provi-

sions at McDougal's Camp and north thereof on the line as first located as are still in the hands of the Engineer and undisposed of at the price at which same were taken over from him by the Engineer, and for the purposes of avoiding all disputes with reference to such change of location the parties shall forthwith adjust all accounts between the contractor and the Engineer arising out of such change of location and the same shall be certified by the Engineer and the balance paid to the contractor contemporaneously with the execution and delivery of these presents.

8. The provisions of paragraphs 5, 6, 7, 8, 9, and 10 of the agreement between the parties hereto dated the 14th day of September, 1905, so far as same relate to traffic and business, after the 15th day of September, 1905, shall continue to be binding upon the parties and shall apply to the extended time hereby given for completion of said contract in the same manner and to the same extent as to the time originally limited by the said contract of the 7th June, 1904, for the completion of the said work.

9. Subject to the amendments made by these presents the said contract of the 7th June, 1904, and the bond of the said sureties for securing due performance thereof shall be and remain in full force, virtue and effect and the sureties shall be and continue liable on said bond for the due performance of the said contract as hereby amended, and all rights, remedies and powers of the said Commission and of the Chief Engineer thereof conferred, given or reserved in and by said contract and bond are hereby expressly reserved subject only to the amendments aforesaid.

In witness whereof this agreement has been duly executed by the Commission under its corporate seal and the hands of its Chairman and Secretary and duly signed, sealed and executed by the other parties hereto.

Signed, sealed and delivered

in the presence of

W. THOMSON,

As to the signature of

A. R. Macdonnell,

B. CHEVIER.

As to the signature of

Wm. Harty,

ELIZABETH LONG,

As to the signature of

Thomas Long,

A. J. McGEE.

As to the signature of

J. L. Englehart and

H. W. Pearson.

(Sgd.) A. R. MACDONNELL.

(Seal)

(Sgd.) WM. HARTY.

(Seal)

(Sgd.) THOMAS LONG.

(Seal)

THE TEMISKAMING AND NORTHERN ONTARIO
RAILWAY COMMISSION.

(Seal)

(Sgd.) J. L. ENGLEHART,

Chairman.

(Sgd.) H. W. PEARSON,

Secy.-Treas.

AGREEMENT FOR TRANSPORTATION OF LOGS.

Memorandum of Agreement made this fifth day of June, A.D. 1906, between the Empire Lumber Company, Limited, and the Imperial Lumber Company, Limited, hereinafter called the Lumber Companies, and the Temiskaming and Northern Ontario Railway Commission, hereinafter called the Commission.

Whereas the Empire Lumber Company, Limited, is the owner of a saw mill at Latchford, on the line of railway of the Commission, and has contracted with the Imperial Lumber Company, Limited, for the sale to said Imperial Lumber Company, Limited, of certain lumber to fill which contract it is proposed to secure logs deliverable to the Empire Lumber Company, Limited, at Haileybury, on Lake Temiskaning.

And whereas the Lumber Companies have requested the Commission to construct a spur or switch from some suitable point on the main line of the railway of the Commission near the Village of Haileybury to the water front at or conveniently near to the Haileybury Wharf, for the purpose of receiving delivery of such logs at Haileybury in order that same may be transported over the line of railway of the Commission to Latchford.

And whereas the Lumber Companies are prepared in consideration of the construction of such spur or switch to guarantee to the Commission the sum of not less than fifty thousand dollars for transportation of logs for the Lumber Companies from Haileybury to Latchford during the seasons of 1907, 1908, 1909, 1910, 1911, 1912 and 1913.

Now these presents witness that the agreement between the parties in the premises is as follows:—

1. The Commission will construct and have ready for operation as early as practicable in the season of 1907 and not later than the 1st day of July, 1907, a spur or switch from some suitable point on its main line of railway near the Village of Haileybury to the water front of the Village of Haileybury at a point at or conveniently near to the Haileybury Wharf, so situated that logs may be loaded directly from the water to the car and will from time to time within seven years next after the opening of the season of 1907 transport for the Lumber Companies from said switch or siding to Latchford logs cut in suitable lengths for shipping which the Lumber Companies shall from time to time load on such cars as may be supplied by the Commission (cars to be loaded to full capacity and unless in case of cars of less capacity minimum freight shall be six dollars per car) on said spur or siding subject to the terms of the usual form of contract for transportation of logs from time to time used by the Commission for the uniform freight rate of one dollar per thousand feet board measure, delivery to be accepted by the Empire Lumber Company, Limited, on cars on mill siding at Latchford.

2. In consideration of the premises the Lumber Companies jointly and severally covenant with the Commission that they will during each of the seasons of 1907, 1908, 1909, 1910, 1911, 1912, and 1913 pay to the Commission on account of freight for transportation of logs from Haileybury to Latchford as aforesaid not less than the sum of seven thousand one hundred and forty-three dollars (\$7,143) payable one dollar per thousand feet board measure of logs as delivered at Latchford as aforesaid, the balance of seven thousand one hundred and forty-three dollars (\$7,143) if any not theretofore earned and paid, to be paid in cash by the Lumber Companies to the Commission on the first day of December of each of the said years, provided, however, that on the final adjustment on the first day of December, 1913, the Lumber Companies shall not be responsible to pay hereunder more than the sum of fifty thousand dollars in all unless more than that sum shall have been earned by the transportation of a larger quantity of logs than fifty million feet, and provided further that the liability of the Lumber Companies to pay hereunder anything in excess of one dollar per thousand feet board measure for logs transported hereunder shall cease so soon as at the rate

aforesaid the Commission shall have been paid the sum of fifty thousand dollars for transportation of logs which shall have been shipped from said siding to the mill of the Empire Lumber Company, Limited, at Latchford, to be there sawn into lumber or otherwise manufactured.

In witness whereof the parties have caused these presents to be executed under their respective corporate seals and under the hands of the proper officers in that behalf.

Witness

L. O. WALTON.

(Sgd.) JAMES A. ROSS,
President.

(Seal)

(Sgd.) A. W. HOLANDER,
Secretary.

THE IMPERIAL LUMBER COMPANY,
LIMITED,

(Seal)

L. O. WALTON.

(Sgd.) CHAS. D. WARREN,
President

(Sgd.) ORMSBY J. DONAGH,
Secretary.

THE TEMISKAMING AND NORTHERN ONTARIO
RAILWAY COMMISSION,
(Seal)

A. J. MCGEE.

(Sgd.) C. B. SMITH,,
Chairman.

(Sgd.) H. W. PEARSON,
Secy.-Treas.

TELEPHONE AGREEMENT.

Memorandum of Agreement made in duplicate this twenty-second day of January, nineteen hundred and six, between The Bell Telephone Company of Canada, Limited, hereinafter called the "Telephone Company," party of the first part, and The Temiskaming and Northern Ontario Railway Commission, hereinafter called the "Railway Company," party of the second part. Whereas:—

The Railway Company is the owner of a Telephone Line extending from the Town of North Bay to Widdifield, Mulock, Moose Lake, Riddle, Diver, Otter, Bushnell, Redwater, Doherty, Temagami, Rib Lake, Johnston's, Latchford, Cobalt, Haileybury and New Liskeard, all in the District of Nipissing, Province of Ontario, and purposes making further extensions thereto, and has requested the Telephone Company to make connection with the aforesaid system in the manner and subject to the terms and conditions hereinafter set forth.

Now this agreement witnesseth: That in consideration of the stipulations and agreements entered into by the Railway Company.

The Telephone Company agrees:

1. To permit and provide at its office in the Town of North Bay the equipment necessary for an interchange of telephonic conversations and messages between the Telephone systems of the Railway Company, as above

set forth, and the telephone system of the Telephone Company, under the general rules and regulations of the Telephone Company, and at the charges hereinafter provided for.

2. To string the necessary wires on its existing pole route from its office in the Town of North Bay to the nearest junction point with the lines of the Railway Company, within the limits of the Town of North Bay, there to connect with the lines of the Railway Company.

The Railway Company agrees:

3. To maintain its telephone lines and the instruments and apparatus connected thereto, in good working order and make repairs thereto with all reasonable despatch at their own expense.

4. Not to take subscribers to their system in the Town of North Bay, nor in any other manner enter into competition with the Telephone Company.

5. To give the Telephone Company thirty days written notice in advance should it propose to extend its lines or enter into connecting arrangements with other Telephone Companies for an interchange of business.

6. To use in connection with its telephone system only the Telephone Company's Standard Long Distance Telephones.

It is mutually agreed:

7. That the following charges shall be exacted for local messages and conversations of three minutes duration or less, which may be transmitted between the Telephone Company's office in the Town of North Bay, and stations on the system of the Railway Company, with a proportionate charge for any period in excess of such three minute limit:—

Between North Bay and	1st 3 min.	each add'l. min.
Bushnell	\$0 25	\$0 05
Cobalt	50	15
Diver	20	05
Doherty	30	10
Haileybury	50	15
Johnston's	45	15
Latchford	50	15
Moose Lake	15	05
Mulock	15	05
New Liskeard	50	15
Otter	20	05
Redwater	30	10
Rib Lake	40	10
Riddle	20	05
Temagami	35	10
Widdifield	15	05

The division of tolls so collected shall be as follows:—

On all messages and conversations to and from North Bay with points on the system of the Railway Company, the Telephone Company shall receive a terminal charge of five cents (5 cts.) per message, irrespective of the duration of same or the amount collected, the balance of the toll accruing to the Railway Company.

On all messages and conversations originating at North Bay to points on the system of the Railway Company, the Telephone Company shall receive a commission of twenty per cent. (20%) of the Railway Company's portion of the tolls collected in addition to the terminal charge referred to herein.

8. That the charge for each message or conversation of three minutes duration or less, which may be transmitted over the lines of both parties between stations on the Telephone Company's system beyond North Bay, and stations on the system of the Railway Company shall be the regular established rates of the Telephone Company plus the toll charges enforced by the Railway Company from North Bay to points on its system, as outlined in Clause No. 7 of this agreement, and a proportionate charge for any period in excess of such three minute limit, each party retaining the amount of its line charge.

9. That neither party shall have the right to transmit messages free over the lines of the other party, except that no commission or terminal charge, as provided for in Clause No. 7 shall be paid to the Telephone Company on messages or conversations to or from North Bay in reference to the business of the Railway Company which originate at telephones located in any of the Railway Company's offices.

10. That each party hereto shall be entitled to enforce a reasonable messenger service charge for the delivery of messages to non-subscribers or for calling non-subscribers to the telephone, no commission being payable on such messenger service.

11. That the Telephone Company's office at North Bay shall time all conversations and messages, to and from stations on the Railway Company's system with stations on the Telephone Company's system, and shall decide the rates to be charged thereon.

12. That a regular monthly statement of account shall be furnished by the Telephone Company to the Audit Office of the Railway Company during each following month, or as soon thereafter as possible, when a settlement will be made of the amount due either party by the other.

13. That neither party shall be liable to the other for any error in sending messages or for the failure of any conversation, whether it be the fault of any operator, agent, or other person, or from any other cause whatsoever, and that each party hereto shall alone be liable (if there be any liability) for any accident, damages, losses, or costs, occurring or incurred at or on its lines or instruments.

14. That both parties hereto shall have the right to refuse to allow or accept calls or business to or from any office or subscriber on the other Company's system whose telephone equipment in its estimation is not in proper order to give satisfactory service, or if the lines and apparatus are not maintained in an efficient condition to give good talking results.

15. That urgent messages to or from officials and employees of the Railway Company shall at all times take precedence over other business over the Railway Company's line.

16. That either party hereto shall have the right to cancel this agreement at the end of any yearly term after February 1st, 1907, on giving notice in writing to the other party three months in advance of the expiration of any such term.

In witness whereof the parties hereto have signed these presents.

(Seal.)

To have and to hold the said hereby demised premises unto the Lessee for the term of nine hundred and ninety-nine years to be computed from the day of the date hereof, yielding and paying therefor unto the Lessor the clear yearly rent or sum of one dollar of lawful money of Canada yearly on the day of \$1.00 per annum and renders of metals, in each and every year during the continuance of the said term without any deduction, defalcation or abatement whatsoever, the first payment to be made on the day of one thousand nine hundred and , and further yielding and paying therefor as additional rental the renders of metals and ores or the value thereof as hereby reserved, payable as and when hereinafter provided.

It is agreed between the parties as follows and this demise is made upon and subject to the following express terms, conditions and stipulations:—

1. In these presents the word "Lessor" shall be deemed to include the successors and assigns of the said Lessor, and the word "Lessee" shall be deemed to include the executors, administrators and assigns of the said Lessee and all the covenants, conditions, terms and stipulations of these presents shall be binding upon and shall inure to the benefit of the successors and assigns, and the executors, administrators and assigns of the parties respectively.

2. In these presents the words "Mining Engineer" shall mean the Mining Engineer for the time being and from time to time appointed by the Lessor to act in reference to the mining operations to be carried on in pursuance of these presents.

3. This demise shall include the liberties following, which are however to be enjoyed by the Lessee, subject in all cases and at all times to any and all orders, instructions and directions of the Mining Engineer and to the covenants of the Lessee herein contained:—

(a) To search the demised premises for metals and ores.

(b) To build, erect, put, place or set up from time to time on the demised premises such buildings, structures, engines, plant and machinery as may be necessary or convenient.

(c) From time to time to dig for, mine and obtain the demised metals and ores and (subject to rendering to the Lessor the Lessor's share of the value thereof as herein provided) to dispose of the same for the Lessee's benefit.

Rental.

25¢ renders.

50¢ renders.

4. The Lessee shall pay the said annual rent as and when payable as aforesaid, and shall further render and pay to the Lessor during the said term at the times and in the manner hereinafter provided as further rent one-fourth of the value at the mouth of the mine of all metals and metallic ores produced or obtained by the Lessee from the demised premises or any part thereof which shall assay less than one thousand dollars per ton, and one-half of the value at the mouth of the mine of all such metals and metallic ores which shall assay one thousand dollars per ton and upwards, it being expressly agreed that for the purposes hereof the value to be determined from assays shall be the full value of each and every marketable constituent of the mineral at its full market price at the most favorable place for smelting or treatment, no deductions being made for mining.

Powers of mining engineer.

5. The true intent and meaning of these presents is that the Lessee shall render and pay to the Lessor the aforesaid proportion of the value of such metals and ores (free of cost of mining and of all transportation and other charges) classified as nearly as may be as such metals and ores lie in the veins or seams of the earth, and for the purpose of carrying out such intent all metals and ores from time to time mined or produced hereunder shall, before

being shipped or transported from the demised premises, be sorted so as to produce so far as that can reasonably be done the maximum quantity of ores entitling the Lessor to the higher proportion of value, and no such metals or ores shall at any time be shipped or transported from the demised premises without the consent of the Mining Engineer or his agents in that behalf first had and obtained, and all such metals and ores shall be sorted and shipped under and subject to the supervision, directions and instructions of the Mining Engineer and his servants and agents duly authorized in that behalf whose orders, instructions and directions in the premises shall at all times be strictly obeyed, observed and adhered to by the Lessee, his servants and agents. The Mining Engineer, if dissatisfied with the sorting at any time done, shall have the right from time to time to re-sort any such metals and ores at the cost, charges and expense of the Lessee, and his decision on any such re-sorting shall be final and not open to question. Should any metals or ores be at any time shipped with reference to which upon the assayed value thereof being ascertained whether re-sorted by him or not, the Mining Engineer shall in his discretion consider that same have not been sorted or otherwise handled or dealt with so as to fairly carry out the intent aforesaid, he shall in every such case at any time within days after written notice to him of the ascertainment of the assayed value of any such metals or ores have the absolute right, power and authority in his sole and uncontrolled discretion to arbitrarily classify the metals and ores embraced in such shipment so as to secure to the Lessor what he shall deem its due proportion of the value of such metals and ores according to the intent aforesaid, and his decision in all such matters shall be absolutely conclusive and binding upon the parties, and the amount so found due by him shall for all purposes be the renders payable by the Lessee to the Lessor hereunder in respect of any and all metals and mineral ores embraced in such arbitrary classification.

6. The Lessee shall from time to time and at all times keep the Lessor indemnified against all actions, proceedings, claims, demands and expenses arising or alleged to arise out of or in connection with the working of the demised premises or any part thereof, or with the exercise of the rights, liberties and powers hereby granted or any of them. Indemnity.

7. The Lessee shall erect, maintain and keep sufficient fences and guards for the protection of man and beast around every shaft or other opening sunk or made on said premises or any part thereof, and whenever and so often as any shaft or other opening shall have become unnecessary for the further working of the demised premises, the same shall be immediately filled up so as to obviate all danger therefrom, and to the satisfaction in every respect of the Mining Engineer. Guarding openings.

8. The Lessee shall from time to time keep all buildings, workshops, engines and fixed machinery, tramways, roads, shafts, adits, levels, drifts and other works which shall from time to be constructed, erected, built, placed or made in or upon the said premises for or in connection with the mining or other operations of the Lessee in good and substantial repair, condition and working order, and shall from time to time duly and properly secure all such shafts, adits and other underground workings with timber, props or other effectual means. Keep buildings and plant in repair.

Passages and
bridges.

9. The Lessee shall from time to time make and keep in proper repair for the safe and convenient passage of the Lessor, its servants, agents, workmen and all other persons having lawful occasion to go upon the said premises or any part thereof proper bridges, protected by adequate railings or otherwise over any open or unsafe parts of any adits or other works.

Taxes.

10. The Lessee shall pay all provincial, municipal and other taxes which may at any time be assessed or levied against such demised premises or any part thereof, or against the improvements thereon or any of them, or against the metals or mineral ore the product thereof, or any personal property on the demised premises during the continuance of said term in the same way and to the same extent as if the premises above described were owned in fee by the Lessee; provided however, that this shall not render the Lessee liable to the payment in respect of any metals or mineral ores obtained or procured from the demised premises of any royalties in favor of the Crown which may at any time under the laws then in force be payable in respect of or chargeable against the metals or mineral ores mined or produced in the Province of Ontario, the intention being that the rentals hereby reserved shall be in lieu of all such royalties.

Statutory
obligation.

11. The Lessee shall from time to time conform to and observe all statutory or other rules for the time being in force so far as they affect or shall or may affect the demised premises or any part thereof, and shall keep the Lessor indemnified against all penalties, damages, proceedings, costs and expenses incurred or suffered through or by reason of any breach or non-observance thereof.

Plans.

12. The Lessee shall from time to time and at all times keep or cause to be kept on some convenient part or parts of the demised premises accurate plans and sections on such scale as the Mining Engineer shall direct of all mines and works carried on or remaining open for the time being on the demised premises or any part thereof, and of all veins, beds and lodes which shall from time to time be discovered therein, and shall keep properly and promptly recorded on such plans the progress of all work, and shall from time to time regularly as work proceeds make systematic mine assays according to the most approved methods from time to time in use, and shall properly record all such mine assays on such plans, and shall from time to time as required furnish the Mining Engineer with duplicates of all such plans, together with all such information and particulars as shall enable him to keep complete and up-to-date records of all work from time to time being done, and of all systematic mine assays from time to time being made; and shall also at all times keep proper and sufficient books of account wherein shall be entered from time to time the several quantities of metals and ores mined or otherwise procured from the demised premises with the dates of the production thereof and all other particulars necessary or convenient for ascertaining from time to time the amount or amounts payable or which should or ought to be payable to the Lessor hereunder, and shall permit the Lessor, its agents or representatives from time to time and at all times to inspect the said plans and books of account and to

Mine assays.

Books of
account.

take copies thereof or extracts therefrom, and shall upon the expiration or sooner determination of said lease deliver up all such plans and books of account to the Lessor.

13. The Lessee shall promptly render to the Lessor from time to time such periodical and occasional statements and abstracts from the books of account of the Lessee and otherwise, shewing all necessary particulars about the operations of said mines in such form and with such particulars as shall or may from time to time be required by the Lessor. Rendering statements.

14. The Lessee shall from time to time whenever so required permit the Lessor or its agent or agents, with or without clerks, surveyors, engineers, miners, workmen and other persons at all reasonable times to enter upon the demised premises or any part or parts thereof for the following purposes, or for any other purpose considered necessary by the Lessor:— Lessor's right of inspection.

- (a) To inspect and examine the demised premises and all buildings, erections, plant, machinery and workings thereon, and all ores and metals produced therefrom for the purpose of ascertaining whether the same are in good and substantial order, condition and repair, and whether the operations of the Lessee are being carried on in a proper manner in accordance with the intent of these presents.
- (b) To take plans of said workings or any of them.
- (c) To inspect the machines and methods used or employed on said premises for assaying the products of the demised mines, and to test their accuracy in such manner as may seem expedient, and
- (d) To see and supervise such assays and to take account thereof, and to take and retain proper samples.

And for the purposes aforesaid or any of them to use free of charge all the shafts, machinery, plant and works in or upon or used in connection with the demised premises, and to have all necessary assistance from the miners and others in employment of the Lessee.

15. Assays for determining values on which settlements are to be made must at all times be made upon truly representative samples taken by thoroughly competent persons approved of by the Mining Engineer, and in manner approved by him and in the presence of the Mining Engineer or his agent duly authorized in that behalf, and all such samples must be divided into two or more portions, one portion of which shall be kept by the Mining Engineer or his agent for check assay and valuation, and in the event of any disagreement the sample reserved for the Mining Engineer, or if considered necessary by him, a new sample taken by him in such manner as he shall think proper shall be assayed by an assayer selected by the Mining Engineer, whose decision thereon shall be final, provided that same shall not interfere with the aforesaid right of the Mining Engineer to arbitrarily classify whenever he shall think it necessary to do so. Sample assays.

Payment of
renders.

16. The Lessor's proportion of the value of all metals and mineral ores reserved as portion of the rental as aforesaid shall be payable by the Lessee to the Lessor in cash at the head office for the time being of the Lessor within ten days from the completion of the assay in respect of any such metals and mineral ores from time to time without any deduction or abatement for commission, exchange or otherwise, and whenever and so often as the Mining Engineer shall arbitrarily classify any metals or ores under paragraph 5 of this contract after payment shall have been made in respect of such metals or ores hereunder the difference between such payment and the amount due under such arbitrary classification shall be similarly payable within ten days after notice in writing to the Lessee of the result of such arbitrary classification.

Not assign
without leave.

17. The Lessee shall not nor will during the said term assign, transfer or set over or otherwise by any act or deed procure the said premises or any of them to be assigned, transferred, set over or sub-let unto any person or persons whomsoever without the consent in writing of the Lessor first had and obtained.

Shipments
over lessor's
railway.

18. During the continuance of the said term all metals and mineral ores and other freight emanating from or connected with the Lessee's mining business on the demised premises shipped out by or on behalf of the Lessee shall be shipped via the railway of the Lessor, and all supplies and other freight of every nature intended for or connected with the said business shipped in for or by the Lessee shall be so shipped via the railway of the Lessor and by no other route, provided that no greater toll shall be chargeable to the Lessee for any such transportation than the tolls from time to time charged by the Lessor to other parties for transportation of similar freight between the same points.

Right of
distress.

19. If whenever and so often as default shall be made in payment of any sum payable to the Lessor as the Lessor's proportion of the value of metals and mineral ores as aforesaid, whether payment shall theretofore have been demanded or not, the Lessor may from time to time seize and distrain the goods, chattels and effects of the Lessee for the time being in, upon or about the premises hereby demised, or any adjoining or neighboring lands or works for the time being held therewith or otherwise used or occupied by the Lessee, or may from time to time in respect of any such default seize and distrain all metals and mineral ores produced or obtained by the Lessee from the demised premises, whether in or upon the said premises or elsewhere and out of the proceeds of the sale or other disposal of such goods, chattels and effects, metals and ores so distrained may retain the share and proportion of the value of all metals and ores or other rental then due to the Lessor, together with such further part thereof as shall be sufficient to cover the costs of and incidental to the distress and sale and the Lessor's proportion of the value of the metals and ores sold under such distress and pay the residue over to the Lessee.

Cancellation
of lease on
default.

20. If and whenever any rent or renders payable by the Lessee to the Lessor as aforesaid shall be in arrear for a period exceeding ninety days, whether payment of the same shall have been legally demanded or not, or in case of the breach of any covenant

on the Lessee's part herein contained, or in case any such covenant on the Lessee's part shall not be performed or observed, and such breach or non-observance shall continue for a period exceeding ninety days, then and in any of the said cases it shall be lawful for the Lessor at any time thereafter to re-enter upon the demised premises or any part thereof in the name of the whole and thereupon this demise shall absolutely cease and determine, but without prejudice to the obligations of the parties with reference to anything which shall have occurred prior to such determination.

21. For further assuring the Lessor's rights hereunder the Lessor shall have the right at any time and from time to time when and so often as the Lessor shall think necessary or expedient for the Lessor's protection to require delivery to the Lessor of all metals and mineral ores produced or obtained upon the demised premises to the intent that the Lessor, its servants or agents may sort and sell or otherwise dispose of the same and deduct from the proceeds all moneys payable by the Lessee to the Lessor, including all expenses of and incidental to such sorting, sale or other disposal and account to the Lessee for the surplus, if any, it being expressly agreed that in every such case the Lessor shall not be responsible or liable to the Lessee for any loss, injury or damage connected with the transportation, sampling, assaying, sale or other realization of such metals and mineral ores, or in connection with the collection and payments of the proceeds thereof, save and except any loss, damage or injury occasioned by the wilful default or neglect of the Lessor, its servants or agents in that behalf.

Lessor's right to delivery of metals.

22. All remedies hereby reserved in favor of the Lessor are intended to be cumulative, and it is agreed that no waiver or waivers by the Lessor of any breach or non-fulfilment of any of the Lessee's covenants or obligations, and no waiver by the Lessor of any of its rights hereunder shall apply to or affect any future or other breach, failure or right, save and except the breach, failure or right so waived.

Remedies-cumulative.

23. At the expiration or sooner determination of the tenancy hereby created the Lessor shall deliver up the demised premises with all buildings, fixed machinery, shafts and underground workings, tramways, roads, fixtures and other conveniences which shall then be in used upon or under the lands in connection with the demised premises in good and substantial repair, condition and working order to the intent that the same may be available for future mining operations on said premises.

Determination of lease.

Delivery of plant.

24. Should any dispute or difference arise at any time during said term as to the rights, duties or liabilities of the parties hereunder, or should any discrepancy appear or any question, dispute or difference arise respecting the true construction, meaning and intent of these presents or of any matter or thing herein contained, or should any difference arise between the parties in any other matter in any way touching or arising out of these presents or connected with the premises hereby demised, or with operations or dealings affecting or flowing from the same, all such disputes,

Disputes to be settled by mining engineer.

questions and differences shall from time to time be referred and they are hereby referred to the determination, settlement and adjustment of the Mining Engineer, whose decision from time to time in the premises shall be absolutely final, binding and conclusive upon the parties.

In testimony whereof the Lessor hath caused these presents to be executed under its corporate seal and the hands of the proper officers in that behalf, and the Lessee has executed these presents under his hand and seal.

Signed, Sealed and Delivered }
In the presence of:

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Annual Report
of
The Ontario Railway
and
Municipal Board
To December 31st
1906

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ANNUAL REPORT

OF THE

The Ontario Railway and Municipal Board

TO DECEMBER 31st, 1906

To His Honor WILLIAM MORTIMER CLARK, K.C.,

Lieutenant-Governor of the Province of Ontario in Council.

The Ontario Railway and Municipal Board, appointed under the Ontario Railway and Municipal Board Act, 1906, in pursuance of Section 56 of said Act beg leave respectfully to report.

RULES, REGULATIONS, SPECIFICATIONS AND FORMS.

Section 39 of the said Act authorized the Board to make general rules, governing so far as is not inconsistent with the expressed provisions of that Act and of the Railway Act, its practice and procedure and generally for carrying the Act into effect. In compliance with that enactment the Board, immediately after its appointment, drafted rules of practice and procedure and the regulations and standard specifications required by the Ontario Railway Act of 1906, and prepared forms to facilitate the practice before the Board. The rules of practice and procedure prescribed by the Board were promulgated by publication in the Ontario Gazette, and thereby have the same effect as if they were enacted in the said Act. The rules of practice and procedure, regulations, specifications and forms appear in the appendix to this report.

In the preparation of their rules, the Board endeavored to make them as simple and free from technicalities as possible, keeping in view the necessity for the order and method, that should mark the proceedings of every judicial tribunal. The design of the Board was to make the rules so intelligible that with the aid of the forms, any mayor, reeve, or municipal clerk could, in ordinary, clear and concise language, prepare and launch an application. One of the rules provides that no proceedings shall be defeated by any technical objection based upon defects in form, it being the policy of the Board that having the parties before it, the controversy should be decided according to the very rights of the parties, and that the proceedings should not be delayed or be made oppressive by mere technicalities. The policy adopted by the Board in the preparation of their rules and forms has been justified by the fact that several important applications to the Board have been made by municipal officials.

At the suggestion of the Board, the rules of practice, regulations, standard specifications and forms were printed in pamphlet form and a copy was sent to the clerk of every city and town in the Province, and to each practicing firm of lawyers in Ontario.

ACTION OF THE BOARD OF ITS OWN MOTION.

Section 18 of the Act provides that the Board may of its own motion, or shall upon the request of the Lieutenant-Governor in Council, inquire into, hear and determine any matter or thing which it may inquire into, hear and determine upon an application or complaint. The Board has acted upon its own initiative in several cases and will do so again in a case of sufficient gravity, or when, apparently it is necessary for the protection and safe-guarding of the public. The Board, however, think it only reasonable to assume that the citizens themselves, as well as the mayors and members of the respective councils of the different municipalities in the Province, know their own business, understand their own local conditions, are fully alive to their own requirements and are perfectly competent to protect their own interests by invoking the intervention of the Board when necessary. The Board prefers that some interested party should set the law in motion, for reasons which are obvious. The Board has very responsible and drastic powers delegated to it by the Act, and for that reason should act upon their own initiative with due caution. It will readily occur upon reflection that if the Board were to undertake to respond to calls, which anyone, in any part of this extensive Province might make at pleasure and without responsibility, it must soon, from mere accumulation of cases, find itself paralyzed and incapable of effective work. The Board perceived this at the outset and considered it necessary to require that applications be made and signed by the parties or their solicitors, in proof of good faith, and that they set forth sufficient facts to make out a *prima facie* case of wrong or injustice, such as would justify the Board in calling upon the opposite party to respond. Had the Board not adopted this precaution it would accomplish much less than it is, because its attention would be withdrawn from substantial and bona fide applications to those without foundation and which might be inconsiderately made. This would result in distraction and in a waste of time, and would render impossible much that the Board believes has already been usefully accomplished. Again, one's sense of British justice revolts at the idea of a judicial tribunal acting as prosecutor, counsel and judge. Not only should justice be done by the Board, but the parties to every controversy should depart hence from the Board, feeling that their cause had been fairly heard and decided. This could never be brought to pass if the Board initiated the proceedings, examined or cross-examined the witnesses and was thereby forced to exchange the zeal of the advocate for the impartiality of the Judge. For these reasons the Board feel that they are justified in the vast majority of cases in insisting that applications, requiring its action, should be made responsibly and with sufficient particularity to put the opposite party on his defence.

In many cases the complaints were in reference to matters over which the Board had no jurisdiction and in other instances the complainants were under the impression that the Board could intervene and redress an alleged grievance on an *ex parte* statement. In no case has the Board turned a deaf ear to any complaints because it had no jurisdiction, or by reason of its informality, or the mistaken belief of the complainants. If the facts alleged indicated a possible wrong, the Board at once entered into correspondence with the party complaining with the result that he was advised on the question of jurisdiction, and as to the course that should be pursued if the complaints turned out to have merits. In some instances, where the complaint was informal but well founded, the party complained against was notified by the Board with the result that the cause of complaint was

put right without formal proceedings being rendered necessary. The Board believe that this method of disposing of complaints is in many cases more useful, not only because it is expeditious, but because of the saving of expense and of the tendency to promote harmony rather than friction.

RAILWAY FARES.

Immediately after its appointment the Board, as was its duty, took over the books, papers, plans and documents in the custody of the Railway Committee of the Executive Council. As soon as this was done and the Board had informed itself of the business transacted and of the orders that had been made by that Committee and had made enquiry as to the railways under its jurisdiction, the Board at once gave its attention to the requirements of section 171 of the Ontario Railway Act of 1906. This section provides that the fares, to be taken by a company on a railway operated by electricity, shall not exceed five cents for any distance not exceeding three miles, and where the distance exceeds three miles then not exceeding two cents per mile or fraction thereof for the distance actually travelled. It is further provided that children under ten years of age shall be carried for three miles or less for three cents and for any additional distance for half fare, but children in arms shall in all cases be carried free.

In order to ascertain that the provisions of this section of the Ontario Railway Act were being observed by the railways under the jurisdiction of the Board, in addition to communication by telephone with such companies as could be reached in that way, the Board sent out a circular letter requiring such companies to submit to the Board their tariff of fares.

The Board had considerable difficulty in ascertaining whether or not the provisions of section 171, as to fares, were complied with, by reason of the conflict of jurisdiction over electric railways. By virtue of ss. 10 of section 92 of the British North America Act of 1867, railways connecting the province with any other or others of the provinces, or extending beyond the limits of the province and railways wholly situated within the province, which are declared to be works for the general advantage of Canada, are under the jurisdiction of the Dominion, and are entitled to charge the maximum fare of three cents per mile. The Board, as the result of enquiry and investigation, discovered that several electrical railways, although local in their character, had at various times by various acts of the Dominion Parliament been declared to be for the general advantage of Canada, and in that way have been taken from under the jurisdiction of this Province. The enquiries and somewhat superficial examination made by the Board of the various acts which withdrew certain of the electric railways of this province from the jurisdiction of the province, occupied considerable time and much more time will be consumed in the more thorough and exhaustive examination of the Acts that is being made.

As soon as the Board obtained sufficient information at the earliest possible moment it addressed a circular letter to all electric and steam railways in Ontario under its jurisdiction, specially calling their attention to the several sections of the Act, the provisions of which it was the duty of these companies to comply with. In response to this and other notifications of the Board there was a reasonably prompt compliance by the different companies in the Province. In the performance of its duty required by the several sections of the Board Act and of the Ontario Railway Act, 1906, the Board has found it necessary to conduct a very extensive and voluminous correspondence, which could not very well be presented with this report.

RAILWAY LEGISLATION.

The Board have expended a great deal of pains and labor in examining all the Acts of the Legislature of the Province of Ontario regarding railways, both steam and electric, since Confederation, and in some cases previous thereto, with the object of ascertaining the history of each charter granted, either by the Legislature or by Letters Patent. The object of the investigation was to determine which Acts had become effete or were repealed, or had gone out of existence by incorporation in other Acts, or where the names of companies had been changed and generally speaking to determine their final disposition up to date.

In addition to the list of railways under the jurisdiction of the Board which appears in the appendix hereto, the Board have in manuscript form, but which is too voluminous to include in this report, a complete index of all the railway legislation affecting railways, both steam and electric, within the Province of Ontario, enacted either by the Dominion Parliament or by the Legislature of the Province of Ontario. In addition to this the Board have in manuscript form, an index of all the legislation relating to bridges in the Province of Ontario that are used for railway purposes.

By section 57 of the Act the Board may require such returns and statements as to it may seem proper, from municipal corporations or commissions operating public utilities. It is obvious that these returns, if made with due detail and particularity, will be of great use to the Legislature and the public for statistical purposes, and for the ascertainment of the results of the operation of such utilities.

In order that a regular system should prevail as to the returns and statements to be made of such public utilities and their operation, the Board have prepared forms which will be supplied to all corporations and commissions operating public utilities in the Province. These forms appear in the appendix to this report.

The Board have also prepared the forms required by sections 228-235, inclusive, of the Ontario Railway Act, 1906. These forms appear in the appendix and will be supplied to the municipalities and companies operating railways, as required by the Act.

Section 51 of the Act provides that the appeal provided for by section 76 of the Assessment Act shall be to the Board. Two appeals have already been heard by the Board; the judgment in each appears in the appendix.

Section 53 of the Act provides that the Board shall have the following powers:

53. The Board shall have all the powers conferred by The Consolidated Municipal Act, 1903, and amending Acts, upon the Lieutenant-Governor in Council regarding:—

(a) The addition to or taking from any municipality any territory.

(b) The annexation of any territory to any city or town.

(c) The alteration in any manner of the boundaries or limits of any municipality,

(d) The approval or confirmation of by-laws relating to finance, debentures, sinking funds or the creation of debts, in cases where the approval or confirmation of the Lieutenant-Governor in Council is required by The Consolidated Municipal Act, 1903, or any other statute of this Province.

(e) The approval or confirmation of by-laws relating to public highways, roads, streets, or bridges, to street or electric railways or to gas or

waterworks or to any other industry or concern commonly known as a public utility, in cases where the approval or confirmation of the Lieutenant-Governor in Council is required by the Consolidated Municipal Act, 1903, or any other statute of this Province.

The Board have heard seventeen applications under this section of the Act and the judgments or order in each case appear in the appendix.

ARBITRATION BY THE BOARD AND MEDIATION IN LABOR DISPUTES.

Sections 58 and 59 of the Act are as follows:—

58.—(1) A grievance or dispute between a railway or street railway company and its employees may be submitted to the Board for its determination and settlement. The submission shall be in writing, and may contain a statement in detail of the grievance or dispute and the cause thereof, and also an agreement to abide by the determination of the Board, and to continue in business or at work, without a lockout or strike during the investigation.

(2) Upon such submission the Board shall investigate and determine the matters in controversy, and shall render its decision within ten days after the completion of the investigation.

(3) The proceedings shall, as nearly as may be, be the same as in the case of any other enquiry which the Board is authorized to make, but the Board may regulate the proceedings, and the manner of conducting them, as to the Board may seem meet.

59.—(1) Whenever a strike or lockout of the employees of any railway or street railway company or public utility occurs, or is seriously threatened, the Board shall proceed as soon as practicable to the locality thereof, and endeavor by mediation to effect an amicable settlement of the controversy.

(2) Wherever there shall exist in any railway or street railway or public utility a strike or lockout or any strike or lockout by reason of which in the opinion of the Board the general public shall appear likely to suffer injury or inconvenience with respect to food, fuel or light or power or the means of communication or transportation, or in any other respect, and the parties to such strike or lockout will not consent to submit the matter or matters in controversy to the Board, the Board, after first having made due effort to effect a settlement thereof by conciliatory means and such efforts having failed, may proceed on its own motion to make an investigation of all facts bearing upon such strike or lockout, and shall make public its findings, with such recommendations to the parties involved, as, in its judgment, will contribute to a fair and equitable settlement of the differences which constitute the cause of the strike or lockout, and in the prosecution of such enquiry the Board shall have all the powers conferred upon it by any other section or sections of this Act.

Under these sections of the Act, the Board were called upon to settle two street railway strikes.

THE LONDON STREET RAILWAY STRIKE.

On the night of the 25th of July, 1906, the Board received a telegram from J. C. Judd, Esq., Mayor of London, advising them that he had received reliable information that a strike was seriously threatened on the London Street Railway and requesting that action should be taken by the Board under sect. 59 of the Act, and that such immediate action was imperative.

On receipt of the above telegram the chairman of the Board replied by telephone that the Board would go to London the next day, the 27th of July, which the Board did.

In consequence of the Board's mediation, the men on strike returned to their employment and submitted their complaints to the Board for investigation. The result of the investigation and the recommendations of the Board appear in the opinion of the Board and their final report, which is printed in the appendix. Through the press both the company and the men expressed their satisfaction with the action of the Board and no trouble has since arisen.

THE HAMILTON STREET RAILWAY STRIKE.

The strike of the Hamilton Street Railway employees which the Board was called upon to settle, was caused by the impracticability of an award made by the Board of arbitrators, appointed by the company and the men, and which was made in the month of September, 1906, and carried into effect by an agreement dated the 20th day of October, 1906, executed in accordance with the terms thereof.

It is submitted that it is not necessary to go into the history of the mediation by the Board and the conciliation which culminated in an unconditional reference of all matters and disputes between the parties to the Board. The opinion of the Board and the formal award, and the agreements executed in pursuance thereof, which appear in the appendix, will be sufficient without further detail. From the Hamilton press reports and from the fact that the Company and the men are working in harmony, the Board have every reason to believe the settlement it effected is satisfactory to all concerned.

APPLICATIONS FOR REPAIR OF STREET RAILWAYS.

LONDON.

On the 3rd of October, 1906, the Board received a complaint from the Corporation of the City of London, complaining of the state of repair of the Street Railway, and of the fenders, trolley wires, rolling stock and general equipment of the road; and that the Wellington Street Bridge was unsafe, and should be closed to traffic.

The Board, on the 5th day of October, appointed Thursday the 11th of October, at the Court House in the City of London, for the hearing of the complaint. After the first witness on behalf of the city had been examined, Counsel for the Street Railway asked an adjournment for half an hour, in order that he might consider the evidence and the position of matters generally. The adjournment was granted. On the Board resuming its sitting, Counsel for the Company stated that he had arrived at the conclusion to repair the Street Railway, trolley wires, rolling stock and general equipment, as might be recommended by the Board's engineer, and that in reference to the Wellington Street Bridge he would consent to do whatever the Board, after an examination of the bridge, might direct to be done. The Board adjourned until eight o'clock in the evening, and in the meantime, with the assistance of a mechanic, made a personal inspection of the bridge. The timbers of the bridge were bored into to ascertain their condition and they were found to be in much better condition than they appeared to be. The bridge was further tested by running a number of cars over it in continuous procession.

On the resumption of the sitting at eight o'clock, the Board made an interim order directing that the Company be permitted to use the Wellington Street Bridge, running their cars at the rate of not more than four miles per hour and slackening speed at least fifty feet from the south end of the bridge. The Board further ordered that the Company at once repair the bridge by taking out the decayed ties and replacing them with new ones, and by jacking up the stringers and putting in shims, using plank not less than two inches in thickness and four feet long, and that the whole deck of the bridge be overhauled and permanently repaired.

On the 11th of October, the Board appointed James C. Royce, Esq., of the City of Toronto, Consulting Engineer, to inspect the state of repair of the track, trolley wires, fenders, rolling stock and equipment of the Railway and report to the Board and to make directions. On the 10th of November, Mr. Royce made his report and recommendations.

On the 10th of November, the Board made a formal order, directing that the repairs, renewals, reconstruction, alterations, new work and equipment of the Railway, set forth and recommended in Mr. Royce's report, be made, done or furnished at the time and in the manner set forth in the report.

The Board are advised that the London Street Railway Company are carrying out the order and report, and will have complied with the Board's order within the stipulated time. The various orders and Mr. Royce's report appear in the appendix.

HAMILTON.

On the 26th July, 1906, the Board received a petition from a large number of the citizens of the City of Hamilton complaining of the condition of the cars, rails, road bed and general equipment of the Hamilton Street Railway, and asking the Board to appoint an expert to examine and report on the condition of the road.

On the 6th of September, the Board received a petition from the Corporation of the City of Hamilton, complaining of the over head system of wires, and the condition of the tracks and road-bed, and the general equipment of the line. The Corporation of Hamilton assumed the complaint of the citizens above mentioned.

At the request of the parties, the Board appointed Thursday, the 27th day of September for the hearing of the complaint. Two witnesses were examined on behalf of the city when the matter was adjourned, and again came up for hearing on the 7th of November. At the request of the Company, this hearing was further adjourned until the 12th of November. Further evidence was taken on the 12th of November. By reason of the strike the trial was adjourned sine die, and was again resumed on the 3rd of January, 1907, when the evidence was closed and the matter argued before the Board. The application stands for judgment. The report of Messrs. Wyse & Middlemist, the Engineers of the Board, appears in the appendix.

INVESTIGATION OF ACCIDENTS.

The Board on the 24th of July, 1906, of its own motion, investigated the causes of two accidents which occurred on the Hamilton Street Railway in the City of Hamilton. The details of the accidents and the result of the investigations appear in the report of the Board printed in the appendix.

TEST OF FENDERS.

Section 209 of the Ontario Railway Act, 1906, provides that a Company operating its line by means of electricity along a highway shall from time to time adopt and use a fender and guard, etc., of a design to be approved from time to time by the Board.

On the 18th of September the Toronto Railway Company, in accordance with sections 209 and 210 of the Ontario Railway Act, 1906, submitted for the approval of the Board, the Twentieth Century Fender and the Jenkins Automatic Fender. The Board appointed Messrs. Wyse & Middlemist, Civil and Electrical Consulting Engineers, to conduct a test, not only of the Twentieth Century and the Jenkins Automatic Fenders, but of all fenders that might be submitted to them for examination and testing.

The Board communicated with the Toronto Railway Company, advising them that it was intended to hold a test of as large a number of fenders as could be got together, requesting the Company to afford the facilities for such test. The Manager of the Company, Mr. R. J. Fleming, at once stated that he would, with great pleasure, provide the track, and whatever cars might be necessary for the test, and that generally he would do everything possible to meet the wishes of the inventors and of the Board. Mr. Fleming put at the disposal of the inventors all the facilities and appliances in the Company's shops to perfect and adjust their equipment. The Board here desire to express their appreciation of the spirit in which Mr. Fleming met the wishes of the Board.

The first test took place on the 27th of November last. In answer to the invitation of the Board, sixteen inventors submitted their fenders to be tested. As a number of inventors were not ready with their fenders, a further test was held on the 15th of January, inst. The report of the engineers, appointed by the Board to conduct the test, appears in the appendix.

SITTINGS OF THE BOARD.

In order to save expense, the Board disposes of as much business at its office in the Parliament Buildings as possible. Where, however, a large number of witnesses are to be examined and a view or inspection is necessary, the sittings of the Board are held in the locality most convenient for the parties interested. Sittings of the Board have been held in London, Hamilton, Belleville, Ottawa, Fort William and Port Arthur.

The necessity for holding the sittings of the Board in Fort William and Port Arthur arose under the Act of 1904, respecting aid to railways, 4 Edward VII., Cap. 18. By virtue of that Act the location of the line of the Lake Superior Branch of the Grand Trunk Pacific Railway from Fort William to the Junction, was subject to the approval of the Railway Committee of the Executive Council. The jurisdiction of the Railway Committee was delegated to the Board by The Ontario Railway and Municipal Board Act, 1906. It was further provided by the Railway Aid Act of 1904, that the location and plans of the passenger and freight stations were subject to the approval and directions of the Board. As the location of the Lake Superior Branch of the Grand Trunk Pacific parallels the Canadian Pacific Railway for nearly sixty miles west of Fort William, the Board deemed it expedient and necessary in the public interest to hold the sittings of the Board at Fort William and Port Arthur, in order to ascertain if a feasible and practicable route could have been obtained without paralleling other lines of railway.

The Board's report and that of their Engineer, Mr. R. Sherwood Elmsley, appears in the appendix.

AMENDMENTS TO THE LAW.

The Board recommends the following amendments to the law:—

The Ontario Railway Act, 1906, 6 Edw. VII., Cap. 30, Sec. 259, repeals the whole of the Street Railway Act, Revised Statutes of Ontario, 1897, Cap. 208, including Sec. 41. That section of the Revised Statutes of Ontario, 1897, reads as follows:—

41.—(1) No municipal council shall grant to a street railway company any privileges under this Act for a longer period than twenty years, but at the expiration of twenty years from the time of passing the first by-law which is acted upon, conferring the right of laying rails upon any street, or at such other earlier date as may be fixed by agreement, the municipal corporation may, after giving six months' notice prior to the expiration of the period limited, assume the ownership of the railway, and all real and personal property in connection with the working thereof, on payment of the value thereof, to be determined by arbitration.

(2) In case the corporation fails to exercise the right of assuming the ownership of the railway, at the expiration of the said period, the corporation may exercise such right at the expiration of any fifth year thereafter, upon giving one year's notice to the Company, and the privileges of the company shall continue until the ownership is assumed by the municipal council, R.S.O. 1887, cap. 171, s. 18.

No doubt section 202 of the Ontario Railway Act, 1906, was intended as a substitution for section 41 of Cap. 208 of the Revised Statutes of Ontario, 1897, but it has been held that such purpose has not been effected. in re Town of Berlin and the Berlin and Waterloo Street Ry. Co., Mr. Justice McMahon, in answering the questions submitted to him, used the following language:—"The attention of the Legislature should be drawn to Section 202 of 6 Edw. VII., cap. 30. (The Ontario Railway Act, 1906), as it does not appear to me to apply to any railways except those to which municipal corporations have granted privileges since the Act came into force." See Ontario Weekly Reporter, Vol. VIII. No. 6, page 288. If the Judge is right in his view, then no municipal corporation has at present the right to assume the ownership of a street railway upon the expiry of the franchise.

The Board also respectfully calls attention to ss. 3 of Sec. 228 of the Ontario Railway Act, 1906. By that ss. it is provided that the returns shall be forwarded to the Board within three months after the 31st day of December in each year, but in as much as ss. 5 of the same Sec. requires the Board to transmit returns to the Lieutenant-Governor in Council, to be laid before the Legislature within twenty-one days from the commencement of each session, in order to have the returns available when the Legislature assembles, they should be brought down to the 30th day of June of each year instead of the 31st day of December of each year. This could be effected by substituting 30th day of June for the 31st day of December in ss. 3 of Sec. 228.

The Board suggests that it might be well to amend Sec. 4 of the Ontario Railway and Municipal Board Act, 1906, by adding another subsection, enacting that where by any Act of the Legislature of Ontario the location of any line of railway and the approximate route and course thereof, and the plans and specifications, or any of the equipment, are subject to the approval of the Lieutenant-Governor in Council, or any of his Ministers, or where it is provided that any Company shall, during the construction of any line of railway, furnish such information as to the location and plans of

passenger and freight stations as may be from time to time required by the Lieutenant-Governor in Council, and shall comply with any directions as may be given for the erection of stations and the number of same, such power, authority or duty should be exercised by the Board instead of by the Lieutenant-Governor in Council or his Ministers.

The reason for this amendment is that several subsidy acts provide that the location of the line, etc., shall be subject to the approval of the Railway Committee of the Executive Council; ss. 7 of Sec. 4 of the Ontario Railway and Municipal Board Act, 1906, vests the jurisdiction of the Railway Committee of the Executive Council in the Board. Other Acts provide that the location of the line of railway and of freight and passenger stations, and the equipment shall be subject to the approval of the Lieutenant-Governor in Council, and in some instances to the approval of a Minister. There does not appear to be any reason why the Board should have jurisdiction in one case and not in the other. No doubt the policy of the Board Act was to delegate authority in such matters as the location of a line of railway and the freight and passenger stations, &c., to the Board for the reason that the Board is in a better position to deal with such matters than the Executive.

The Board respectfully recommends that Section 18 of the Ontario Railway and Municipal Board Act, 1906, should be amended so as to empower the Lieutenant-Governor in Council, at the request of the Board, to appoint Counsel to appear before the Board where the Board, upon its own motion, enquires into, hears or determines any matter or thing which it may enquire into or determine under the Board Act, or any other Act.

The reason for this amendment is that no provision is made for counsel where the Board acts on its own initiative. It is hardly necessary to point out that it is repugnant to every sense of British justice that a judicial tribunal should act as prosecutor, counsel and judge.

The evident intention of the Act appointing the Board being to delegate to the Board the scattered authority in municipal matters vested in the Lieutenant-Governor in Council, and in County Court Judges, as *persona designata*, it might be well to consider if it is not desirable to further that design by vesting in the Board the jurisdiction of the County Court Judges for the approval of by-laws, changing the names of streets, as provided in ss. 2 of Sec. 532 of the Municipal Act of 1903 and under Sec. 617 A. in proceedings to relieve a township corporation of the maintenance of a bridge over 300 ft. in length. Again, in controversies between a County Council and the Council of another municipality under Sec. 618, as to the duty or liability of building and maintaining a bridge over a river, lake or pond, it might be well worth while considering if the jurisdiction, now vested in the High Court to try the dispute, should not be conferred on the Board. Many reasons can be advanced for this change, amongst which are that the Board could deal with such matters more expeditiously and less expensively than is done at present.

The Board respectfully submit, speaking generally, that it would be well, as far as possible to bring under one jurisdiction all municipal matters that heretofore required the sanction or approval of the Executive or County Court Judge. Again, the opinion extensively prevails, with a great many people, that it would be desirable to delegate to the Board authority to arbitrate in all cases where arbitration is necessary under the Municipal Act. This would ensure the decision in such matters being given by a tribunal composed of three members instead of practically by one, as a board of arbitration is now usually constituted. Besides this with the experts at the command of the Board and by reason of the elastic and inexpensive proceed-

ure which the Board has adopted, it is thought by many that all matters requiring to be arbitrated could be more conveniently, expeditiously and inexpensively dealt with by the Board.

In suggesting the above mentioned amendments to the law, the Board have kept in view the desirability of relieving the Executive of the necessity of interfering in matters of purely local concern, wherein very often a good deal of sectional feeling is likely to be engendered.

INSPECTION OF RAILWAYS.

The Members of the Board, either personally or through their Engineer, have inspected the following railways:—The Toronto Street Railway, The Toronto and York Radial Railways, The Hamilton Street Railway, The London Street Railway, The South-Western Traction Coy. Railway, The St. Thomas Street Railway, The Berlin and Waterloo Railway, The Galt, Hespeler and Preston Railway, The Brantford Street Railway, The Grand Valley Railway, The Woodstock Thames Valley and Ingersoll Railway, The Port Arthur and Fort William Electric Railway, The Cornwall Street Railway, and The Hamilton and Dundas Railway.

ACCIDENTS.

The Board, almost immediately after its appointment, promulgated a regulation declaring the manner and form in which reports of accidents should be made to the Board, pursuant to Section 237 of The Ontario Railway Act. The regulation was sent to all the railway companies under the jurisdiction of the Board. An analysis of the accidents reported to the Board between the 31st of May and the 31st of December, 1906, shows that 25 persons were killed and 320 injured.

Dated at Toronto, the 30th day of January, 1907.

JAMES LEITCH,
Chairman.

A. B. INGRAM,
Vice-Chairman.

F. N. KITTSOY,
Member.

RECORD OF MEETINGS AND ABSTRACT OF PROCEEDINGS OF BOARD.

No. 1.

In the Matter of the Application of the Corporation of the City of Belleville for the approval and confirmation of By-law No. 1288 of the Municipal Council of the Corporation of the City of Belleville, to extend the Gas Works, finally passed the 18th day of June, A.D. 1906.

June 12. Application filed.

June 14. Appointment for hearing.

June 19. Inspection of Gas Works and proposed lines of pipe.

June 19. Application heard by Board and order made approving by-law.

No. 2.

In the Matter of the Application of the Municipal Corporation of the Town of Gananoque for the approval of the investment of certain sinking funds.
June. 18. Application filed.

June 20. Application heard by Board and order made approving by-law for the investment of certain sinking funds.

No. 3.

In the Matter of the Application of the South-Western Traction Company to expropriate property in the Township of Yarmouth, in the County of Elgin, the property of one Robert Hepburn.

June 21. Plans, and books of reference received, examined and certified by the Board.

No. 4.

In the Matter of the Application of the Corporation of the City of Stratford for the approval and confirmation of its By-law to raise \$18,000 to extend and improve the Waterworks of the said City of Stratford.

June 19. Application filed.

June 28. Appointment for hearing.

July 4. Application heard by Board and order made approving by-law.

No. 5.

In the Matter of the Application of the Corporation of the City of Niagara Falls for the approval and confirmation of By-law No. 160 of the Municipal Council of the Corporation of the said City of Niagara Falls, finally passed the 11th day of May, A.D. 1906.

July 3. Application filed.

July 4. Appointment for hearing.

July 9. Application heard by Board and order made approving by-law to extend Waterworks.

No. 6.

In the Matter of the Application of the Corporation of the City of Niagara Falls for the approval and confirmation of By-law No. 161 of the Municipal Council of the Corporation of the said City of Niagara Falls, finally passed the 11th day of May, A.D. 1906.

July 3. Application filed.

July 4. Appointments for hearing.

July 9. Application heard by Board and order made approving by-law to extend Electric Light Works.

No. 7.

In the Matter of the Application of the Huntsville and Lake of Bays Railway Company for approval of the location of the line of their Railway.

July 7. Application filed.

July 10. Appointment for hearing.

July 12. Application heard by Board and order made approving location of line of railway.

No. 8.

In the Matter of the Accident to Mrs. Ross and others on the Hamilton Radial Railway, which took place in the City of Hamilton on the 21st day of June, 1906.

July 4. Report of accident received.

July 5. Complaint filed.

July 11. Appointment for hearing.

July 24. Complaint heard by Board at Hamilton.

Aug. 3. Board's report completed and filed with the Attorney-General.

No. 9.

In the Matter of the Accident to Victor Newman on the Hamilton Street Railway, which took place on the 5th day of July, 1906, at the corner of Bay and Herchimer Streets, in the City of Hamilton.

July 7. Application filed.

July 11. Appointment for hearing.

July 24. Complaint heard by Board at Hamilton.

Aug. 3. Board's report completed and filed with the Attorney-General.

No. 10.

In the Matter of the Strike and Complaint of the Employees of the London Street Railway.

July 26. Telegram from the Mayor of London that strike threatened.

July 26. Appointment for hearing.

July 27. Hearing at London, and appointment for further hearing.

Aug. 1. Continuation of hearing.

Aug. 2. Settlement of strike effected.

Aug. 3. Report of Board filed with the Attorney-General.

No. 11.

In the Matter of the Application of the Town of Oshawa for the approval and confirmation of By-law No. 638 of said Corporation to authorize the issue of debentures to the amount of \$20,000, for extension of waterworks.

Aug. 9. Application filed.

Aug. 14. Appointment for hearing.

Aug. 15. Application heard by Board and order made approving by-law.

No. 12.

In the Matter of the Application of the Corporation of the Township of McKillop for the approval and confirmation of its By-law No. 65, for 1906, to appropriate \$3,582.00 of its municipal loan fund towards payment of cost of bridges.

Aug. 13. Application filed.

Aug. 14. Appointment for hearing.

Aug. 17. Application heard by Board and order made approving by-law.

No. 13.

In the Matter of the Completion and Inspection of the South-Western Traction Company's Railway and Equipment.

Aug. 19. Board instructs inspection by engineer.

Sept. 26. Engineer's report on inspection received by Board.

Sept. 29. Copy of report sent to Company with instructions to carry out and complete the recommendations therein within the times therein mentioned, after which the Board would make an order approving of line for the carriage of traffic.

No. 14.

In the Matter of the Application for the Annexation of the Townplot of Brooke to the Town of Owen Sound.

Aug. 20. Application filed.

Aug. 23. The Board having considered application and filings therewith, and noted that there was considerable opposition to the application, directs that all parties interested be made parties to the application, and application made for date of hearing. No further steps taken by applicants to date, Dec. 31st.

No. 15.

Aug. 22. Mortgages dated June 1, 1906, from the Kingston, Portsmouth and Cataraqui Electric Railway Company to Robert Vashon Rogers as Trustee, to secure bonds \$100,000 and interest, received at 9.30 a.m.

No. 16.

Aug. 26. Discharge of Mortgage dated July 19, 1906, from the London & Western Trusts Company, Ltd., (Mortgagees), to the South-Western Traction Company, (Mortgagors), received at 11.30 a.m.

No. 17.

Aug. 29. Received plans and books of reference of the Toronto & York Radial Railway Company (Metropolitan Division). Right of way required to private line to factories east of Holland River and deviation in the Town of Newmarket examined and certified by Board.

No. 18.

In the Matter of the Application of the Town of Owen Sound for the approval of the investment of certain sinking funds.

Aug. 17. Application filed.

Aug. 29. Application heard and order granted approving by-law.

No. 19.

In the Matter of the Application of John Brown, of the Town of Toronto Junction, in the County of York, Esquire, for an order, under Sect. 47, ss. 3, of the Ontario Railway and Municipal Board Act, 1906, for leave to enforce against The Toronto Railway Company the penalty imposed by Sect. 193 of The Ontario Railway Act, 1906.

Aug. 21. Application filed.

Aug. 25. Application filed by the Corporation of the Town of Toronto Junction to refuse and dismiss John Brown's application.

Aug. 30. Appointment for hearing.

Sept. 4. Board hears application and counter application of Toronto Junction: order made dismissing application of John Brown.

Judgment of Board appears in appendix.

No. 20.

Aug. 31. Map or plan and book of reference of the Canadian Niagara Power Company's right of way in the Townships of Stamford, Willoughby and Bertie, and Villages of Chippewa and Fort Erie, all in the County of Welland, received, examined and certified by the Board.

No. 21.

In the Matter of the Application of the Municipal Corporation of the City of St. Thomas, in the County of Elgin, for the approval and confirmation of By-law No. 1618 of said Corporation, to authorize the issue of debentures to the amount of \$16,000 for extension of gas and electric light works.

Sept. 7. Application filed.

Sept. 8. Board considers application and material filed therewith, and makes order approving by-law.

No. 22.

In the Matter of the Application of the Municipal Corporation of the Town of North Toronto, in the County of York, for the approval and confirmation of By-law No. 93 of the said Corporation to authorize the issue of debentures to the amount of \$7,200, for the extension and improvement of the waterworks system of said Town.

Sept. 11. Application filed. Board considers application and material filed therewith and makes order approving by-law.

No. 23.

In the Matter of the Application of the Toronto and York Radial Railway Company for the approval, under Sect. 221 of The Ontario Railway Act, 1906, of Alex. M. Smith, of the City of Toronto, Mechanical Superintendent of said Railway, as an Examiner of Motormen under said Section of said Act.

Sept. 4. Application filed.

Sept. 11. Alex. M. Smith examined at Board's offices by the Board as to his fitness.

Sept. 11. Order made approving appointment.

No. 24.

In the Matter of the Application of the Toronto and York Radial Railway Company for the approval by the Board of the pilot-fenders used on suburban cars of the said Railway Company.

Sept. 11. Application filed.

Sept. 18. The Board's Engineer having examined and reported favorably on pilot-fenders, order made approving same.

No. 25.

In the Matter of the Annexation to the City of Hamilton of that portion of Burlington Beach bounded on the north by the County of Halton, as

shown on Brown John's map, on the east by the waters of Lake Ontario, on the west by the waters of Burlington Bay and Lottridge's Creek, and on the south by the allowance for a road between lots 28 and 29 in the Township of Saltfleet; and also of the Island, known as Magill's Island, and the promontory adjacent thereto, hereafter to be known and called Hamilton Beach.

Sept. 12. Application filed.

Sept. 12. Appointment for hearing.

Sept. 18. Application heard by Board; all parties requested an adjournment *sine die*; adjourned *sine die*.

No. 26.

In the Matter of the Application of the Municipal Corporation of the Town of Mount Forest, in the County of Wellington, for the approval of the By-law of the said Corporation to authorize the issue of debentures to the amount of \$5,000 for the extension of the Waterworks system of said Town.

Sept. 19. Application filed.

Sept. 21. Board having considered material filed, order made approving by-law.

No. 27.

In the Matter of the Application of the Toronto Railway Company for the approval under Sect. 221 of The Ontario Railway Act, 1906, of William Henry Nix, of the City of Toronto, Chief Roadmaster of said Company, as an Examiner of Motormen, under said Section of said Act.

Sept. 21. Application filed.

Sept. 21. After examination of applicant by Board, the Board made order approving appointment.

No. 28.

In the Matter of the Application of the Toronto Railway Company for the approval under Sect. 221 of The Ontario Railway Act, 1906, of Thomas Hogg, of the City of Toronto, Superintendent of Employment of said Company, as an Examiner of Motormen, under said Section of said Act.

Sept. 21. Application filed.

Sept. 21. After examination of applicant by Board, the Board made order approving appointment.

No. 29.

Between the Corporation of the Town of Napanee, Applicants, and the Napanee Water and Electric Light Company, Ltd., Respondents.

Sept. 7. Application filed.

Sept. 18. Appointment for hearing.

Sept. 25. Agreement for settlement concluded and filed.

No. 30.

In the Matter of the Application of the Municipal Corporation of the City of St. Thomas for the approval of the By-laws, Rules and Regulations of The St. Thomas Street Railway Company.

Oct. 4. Application filed.

Oct. 9. Board having perused and considered By-laws, rules and regulations, order made approving same.

No. 31.

In the Matter of the Application of the Municipal Corporation of the City of St. Thomas for the approval under Sect. 221 of The Ontario Railway Act, 1906, of Charles Johns, of the City of St. Thomas, Manager of The St. Thomas Street Railway, as an Examiner of Motormen of the said Corporation's said Railway.

Oct. 4. Application filed.

Oct. 9. Order made approving appointment.

No. 32.

In the Matter of the Application of the Toronto Suburban Railway Company for the approval, under Sect. 221 of The Ontario Railway Act, 1906, of George C. Royce, of the Town of Toronto Junction, Manager of the said Company, as an Examiner of Motormen under said Section of said Act.

Oct. 11. Application filed.

Oct. 15. Board having examined George C. Royce, order made approving appointment.

No. 33.

Between C. W. Watson, Applicant, and The Cataract Electric Company, Ltd., Respondents.

Oct. 11. Application filed.

Oct. 24. Motion for hearing heard. Hearing adjourned until after conclusion of case pending in the High Court of Justice.

No. 34.

Between the City of Hamilton, Applicants, and The Hamilton Street Railway Company, Respondents.

July 26. Petition of residents of James Street and Herchimer Street filed.

Sept. 6. Application filed by Corporation of Hamilton.

Sept. 7. Order made appointing Engineer to inspect the Hamilton Street Railway's line, plant and equipment.

Sept. 26. Engineer's report on inspection received.

Sept. 27. Two witnesses examined on behalf of City and adjourned to 7th Nov.

Nov. 7. Hearing adjourned to 12th Nov.

Nov. 12. Hearing continued with adjournments at request of parties until Jan. 4, 1907, when case argued, judgment reserved.

No. 35.

Between the Corporation of the City of London, Applicants, and The London Street Railway Company, Respondents.

Oct. 3. Application filed.

Oct. 5. Appointment for hearing.

Oct. 11. Application heard by Board. Interim order made by Board for immediate necessary repairs.

Oct. 11. Order made appointing engineer to inspect Respondent's line, plant and equipment.

Nov. 10. Report of engineer received and copy dispatched to both parties.

Nov. 10. Final order made ordering Company to comply with engineer's report in all particulars.

No. 36.

In the Matter of the Application of the Brantford Street Railway Company for the approval, under Sect. 221 of The Ontario Railway Act, 1906, of Robert O. Clark, of the City of Brantford, as an Examiner of Motor-men for said Company.

Oct. 15. Application filed.

Oct. 15. Appointment for examination of Applicant's appointee.

Oct. 19. New appointment, previous one not having been kept by Applicants.

Oct. 31. Application heard by Board, Mr. Clark examined and his appointment approved. Order made accordingly.

No. 37.

In the Matter of the Application of the International Transit Company for the sanction of its By-laws, Rules and Regulations.

Dec. 1. Application filed.

Dec. 3. Board having perused and considered by-laws, rules and regulations, order made sanctioning same.

No. 38.

Between the Corporation of the Town of Dundas, Applicants, and the Hamilton and Dundas Street Railway Company, Respondents.

Nov. 12. Application filed.

Nov. 13. Settlement effected, agreement for settlement signed by both parties.

No. 39.

In the Matter of the Application of the Village of Morrisburg for the approval of its By-law to raise \$15,000 for the extension and improvement of its Water and Electric Light Works.

Nov. 8. Application filed.

Nov. 28. After considerable correspondence and the Board having expressed the opinion that as Applicants could not show that the additional revenue to be derived from the extensions and improvements would be sufficient to pay the debt and interest, the Applicants, this day withdrew their application.

No. 40.

In the Matter of a Complaint as to fares charged by the South-Western Traction Company, running between London and St. Thomas.

Nov. 16. Complaint filed.

Nov. 17. Notice to Company to amend forthwith their tariff of fares and submit same to Board.

Nov. 23. Further notice to Company to submit tariff of fares to Board.

Nov. 26. Notice from Company that track was being chained to obtain correct measurements to fix tariff of fares.

N.B.—No further complaint received herein, and Company is preparing new schedule of fares to submit to Board.

No. 41.

In the Matter of the Fares, Fenders, Highway Crossing Signs, Front Vestibules and Rules, Regulations and By-laws of The Brantford Street Railway Company, Woodstock, Thames Valley & Ingersoll Railway Company, and The Grand Valley Railway Company.

Nov. 2. Notice by Board to Companies to comply with the Railway Act as to fares and the provisions of the Railway Act, in reference to the above matters.

N.B.—The Board is proceeding in the above matters and has had the Companies' lines, cars and equipment inspected by an engineer and will make an order confirming his report when completed.

No. 42.

Between the Niagara Falls Suspension Bridge Company, Appellants, and the Municipal Corporation of the City of Niagara Falls, Respondents.

Nov. 19. Application filed. (Assessment appeal.)

Nov. 27. Appointment for hearing on the 11th December.

Dec. 11. Hearing adjourned to 8th January, 1907, by request of both parties.

Jan. 8. Application heard by Board, judgment reducing assessment from \$175,000 to \$135,000.

No. 43.

Between the Toronto Railway Company, Applicants, and the City of Toronto, Respondents.

Nov. 21. Application filed *re* transfer regulations.

Nov. 23. Appointment for hearing on the 5th December.

Dec. 5. Hearing stands adjourned *sine die* by request of both parties.

No. 44.

Between the Corporation of the City of Toronto, Applicants, and The Toronto Street Railway Company, Respondents.

Dec. 1. Application filed asking for lavatories, etc.

Dec. 15. Appointment for hearing.

Dec. 27. Board hears application: both parties request adjournment *sine die* impending negotiations; adjournment granted.

No. 45.

In the Matter of the Application of the Butler Bros. Hoff Company, of Windsor, in the County of Essex, for an order for a crossing of the line of The Sandwich, Windsor and Amherstburg Railway by the applicant Company's construction road on London Street, in the City of Windsor.

Nov. 29. Application filed.

Dec. 5. Board having considered application, evidence, plans and consents filed, and proposed crossing having been examined by Vice-Chairman Ingram, order made for crossing.

No. 46.

In the Matter of the Strike of the Employees of the Hamilton Street Railway Company. The Board endeavored to effect a settlement by mediation, and finally both the Employees and the Company having agreed to refer all matters to the Board, an award was made.

Dec. 6. Final agreement of settlement in accordance with the award of the Board signed by all parties:

The submission, award, reasons for award and agreements are printed in the appendix.

No. 47.

Between James Macdonald, Applicant, and The Toronto Railway Company, Respondents.

Dec. 8. Application, to close vestibules on street cars, filed.

Dec. 15. Appointment for hearing.

Dec. 27. Application heard by Board, adjourning for purpose of view and further evidence.

Jan. 5. View.

Jan. 9. Continuation of hearing.

Jan. 14. Hearing adjourned *sine die* at request of both parties.

No. 48.

In the Matter of the Application of Margaret Fry Baldwin and Henry St. George Baldwin, executors and trustees of the will of William Augustus Baldwin, Esquire, late of Mashquoh, deceased, and others, for the annexation to the City of Toronto of certain lands in the Township of York.

Dec. 5. Application filed.

Dec. 10. Board having considered application and material filed therewith, order made annexing about thirty-three acres of the William Augustus Baldwin Estate, in the Township of York, to the City of Toronto.

No. 49.

In the Matter of the Mount McKay and Kakabeka Falls Railway Company.

Dec. 21. Location plans, profiles and books of reference filed, examined by Board, and certified.

No. 50.

In the Matter of the Application of the Township of Pattullo for incorporation in the Township of Morley.

Dec. 22. Application filed.

Dec. 26. Board having considered application, and being of opinion that it has no jurisdiction in the matter, so advised applicants.

No. 51.

In the Matter of the Application of Cyril William St. Clare, of the Town of Aylmer, in the County of Elgin, Pork Packer, for an order for the an-

nexation of certain lands and premises owned by him, in fee simple, to the Town of Aylmer.

Oct. 16. Application filed.

Oct. 16. Notice to applicant that Council must pass resolution for annexation.

Oct. 29. Received copy of resolution of Council of Town of Aylmer.

Oct. 30. Appointment for hearing.

Nov. 2. Application heard by Board. Board points out error in description of lands as contained in resolution of council.

Dec. 26. Received further resolution of council curing clerical error in previous resolution. Order by Board annexing the above property, in the Township of Malahide, to the Town of Aylmer.

No. 52.

Between the Canadian Pacific Railway Company, Applicants, and the Municipal Corporation of the Town of Galt, Respondents.

Nov. 19. Application, by way of repeal from Court of Revision, filed.

Nov. 22. Proof of service of application filed.

Nov. 27. Appointment for hearing on 10th Dec.

Dec. 10. Application heard by Board. Appeal allowed as to \$20,000 the assessment of the applicant's bridge, and as to \$1,500 the business assessment against applicants, and in pursuance of consent of council applicants' other property in the Town of Galt assessed at \$20,000. Order granted.

No. 53.

Between the Corporation of the City of Ottawa, Applicants, and the Ottawa Electric Company, Respondents.

Sept. 1. Application, to approve By-law to raise \$50,000 to Extend Electric Light Works, filed.

Nov. 8. Appointment for hearing, at request of applicants.

Nov. 20. Application heard by Board in Ottawa.

Dec. 11. Judgment handed down by Board and order issued in accordance therewith, approving applicant's By-law for the issue of Debentures for \$50,000 for extension of electric light system.

No. 54.

In the Matter of the Application of the Corporation of the Town of Port Arthur for the approval of their By-law No. 870, passed on the 9th day of November, 1906, intituled "A By-law to authorize the issue of debentures to the amount of \$50,000 to pay for the extension of the Water Works System of the Town of Port Arthur."

Dec. 5. Application filed. Board returned papers for correction of clerical errors.

Dec. 12. Papers received with errors corrected.

Dec. 13. Application heard by Board. Further evidence required.

Dec. 15. Further evidence received and order issued approving By-law.

No. 55.

In the Matter of the Application for the Sandwich, Windsor and Amherstburg Railway for the approval under section 221 of the Ontario Rail-

way Act, 1906, of George McLeod, as an Examiner of Motormen for said Company.

Dec. 5. Application filed.

Dec. 8. Board having examined Mr. McLeod, his appointment to be approved on further particulars being furnished.

Dec. 18. Further particulars received.

Dec. 19. Order issued by Board approving appointment.

No. 56.

In the Matter of the Application of the Town of Fort William for the approval of its By-law No. 435, intituled "A By-law to stop up and close a portion of a certain road allowance, highway, reserve or street in the Town of Fort William, known as Water Street, and for conveying the same to parties herein referred to."

Dec. 29. Application filed, material, evidence and plans examined by Board and order made approving By-law.

No. 57.

In the Matter of the Application of the Grand Trunk Pacific Railway for approval of location, and construction of its Lake Superior Branch from Fort William to the Junction with the main line of the said Grand Trunk Pacific Railway.

July 5. Application filed.

Sept. 10. Appointment for hearing.

Oct. 1. Hearing at Town Hall, Fort William, and at the Court House, Port Arthur, Counsel present representing Grand Trunk Railway Company, Town of Fort William, Town of Port Arthur and the Canadian Pacific Railway Company.

STATISTICAL ANALYSIS OF ACCIDENT REPORTS RECEIVED BY THE ONTARIO RAILWAY AND MUNICIPAL BOARD.

Showing Number of Persons Killed and Injured May 31st to Dec. 31st, 1906.

Passen- gers.		Em- ployees.		Travellers on Highway.		Travellers at Crossings.		Tres- passers.		Un- classified.		Total.		
Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Total.
12	196	4	25	7	95	2	4					25	320	345

STATEMENT IN DETAIL OF TRAVELLING EXPENSES AND DISBURSEMENTS.

June	James Leitch, K. C., Chairman of Board	\$106 35
	A. B. Ingram, Vice-Chairman of Board	71 20
	H. N. Kittson, Member of Board	36 50
	H. C. Small, Secretary and Office of Board	77 28
July	James Leitch, K. C., Chairman of Board	115 50
	A. B. Ingram, Vice-Chairman of Board	82 77
	H. N. Kittson, Member of Board	102 80
	H. C. Small, Secretary and Office of Board	68 85
August	James Leitch, K. C., Chairman of Board	61 85
	A. B. Ingram, Vice-Chairman of Board	80 41
	H. N. Kittson, Member of Board	145 90
September	James Leitch, K. C., Chairman of Board	143 00
	A. B. Ingram, Vice-Chairman of Board	52 15
	H. N. Kittson, Member of Board	133 70
	H. C. Small, Secretary and Office of Board	1 00
October	James Leitch, K. C., Chairman of Board	22 40
	A. B. Ingram, Vice-Chairman of Board	71 15
	H. N. Kittson, Member of Board	19 80
	H. C. Small, Secretary and Office of Board	62 60
November	James Leitch, K. C., Chairman of Board	24 28
	A. B. Ingram, Vice-Chairman of Board	43 55
	H. N. Kittson, Member of Board	11 45
	H. C. Small, Secretary and Office of Board	140 07
	W. C. Coe, Court Stenographer of Board	41 85
December	James Leitch, K. C., Chairman of Board	13 50
	A. B. Ingram, Vice-Chairman of Board	42 20
	H. N. Kittson, Member of Board	8 43
	H. C. Small, Secretary and Office of Board	24 65
	W. C. Coe, Court Stenographer of Board	44 96
Total		<u>\$1,850 15</u>

APPENDIX.

THE ONTARIO RAILWAY AND MUNICIPAL BOARD.

The Ontario Railway and Municipal Board under and by virtue of the Ontario Railway and Municipal Board Act, 1906, makes the following rules for regulating its practice and procedure:

INTERPRETATION.

- Interpretation. 1. The Board shall mean the Ontario Railway and Municipal Board.
2. Application shall include complaint and any other proceeding, matter or thing which the Board can hear and determine.
3. Application shall include complaint and any person or persons or corporation applying to the Board to hear and determine any matter or thing.
4. Respondent shall include any person or persons or corporation adverse in interest to an applicant to the Board.
5. Where any matter is not expressly provided for by these rules, the rules and practice under The Judicature Act shall be followed as far as the same are applicable in the discretion of the Board.
6. The provisions of the Interpretation Act and the interpretation clauses of the Judicature Act and of the Ontario Railway Act, 1906, shall apply to these rules unless there is something in the subject or context repugnant thereto.

APPLICATIONS.

- Application. 7. Unless where otherwise provided by Statute applications to the Board shall be by a notice in writing, divided into paragraphs and numbered consecutively, setting forth clearly and concisely, in ordinary language, the nature of the application, and the relief or remedy sought; and may be in the form set forth in the schedule hereto or to like effect.
8. Where a notice is given by a solicitor, it shall contain the solicitor's name and his address or place of business, where the reply, notices, orders, appointments and other documents or writings may be served.
9. Where proceedings are instituted in person, the notice shall contain the address or place of residence of the person giving the notice where the reply, notices, orders, appointments and other documents or writings may be served. If the requirements of this rule are not complied with, the opposite party shall be at liberty to proceed by posting up in the offices of the Board in the City of Toronto, all notices, orders, appointments and other documents or writings required to be served.
10. The notice commencing proceedings before the Board shall be mailed or filed with the Secretary of the Board at the offices of the Board in the City of Toronto, and shall be served

upon the respondent in the manner provided by the Act, unless service thereof is accepted in writing by a solicitor on behalf of the respondent.

REPLY.

11. When a reply is directed to be filed and served the same Reply. shall set forth clearly and concisely in ordinary language, divided into paragraphs and numbered consecutively, the respondent's answer to the application, admitting such parts thereof as are not in dispute. It shall contain the respondent's address or place of residence if filed in person, and that of his Solicitor if filed by a Solicitor; and such reply may be in the form set forth in the schedule hereto or to like effect.

12. The reply shall be delivered to the secretary of the Board or mailed to him by letter prepaid, and a copy thereof shall be served upon the applicant in the manner provided by the Act at his address given in the notice of application to the Board or upon the solicitor of the applicant at his address set forth in the notice if given by a solicitor.

HEARING.

13. Ten days after the service on the respondent of the notice Hearing. of application either party shall be at liberty to apply to the Board on notice of motion in writing for an order fixing the time, place and manner of hearing the application; and if deemed necessary by the Board directing a reply to be filed and served by the respondent, and if the opposite party is not present or represented on such motion a copy of the order made on such application, shall be served upon the said party or his Solicitor ten days before such hearing.

APPLICATIONS ON AFFIDAVITS.

14. The Board may direct that applications shall be heard Applications on affidavits upon affidavits to be filed with the secretary and upon such documentary evidence as the parties may adduce.

RECORD FOR THE HEARING.

15. The party commencing proceedings before the Board Record for the hearing. shall, at least two clear days before the hearing, deposit with the secretary of the Board three copies of the notice of application and reply (if any), and the secretary shall compare such copies with the original notice and reply (if any), on file in his office, and certify said three copies for use of the Board.

SERVICE OF COPIES OF AFFIDAVITS.

16. Where the application is to be made on affidavits, copies Services of copies of affidavits. of the affidavits upon which the application is to be heard, shall be served with a copy of the order for hearing, and the affidavits in defence shall be filed with the secretary and served on the opposite party within eight days thereafter, and any affidavits in reply

shall be filed and served by the applicant upon the respondent within four days after the service of the affidavits in defence. Affidavits used before the Board or in any proceeding under the Act, may be sworn to before any person authorized to administer oath to be used in the High Court of Justice or before a Justice of the Peace.

ORDERS FOR PRODUCTION, INSPECTION, DISCOVERY, AND TAKING EVIDENCE BY COMMISSION.

Orders for production, inspection, discovery, and taking evidence by commission.

17. Ten days after the service of the notice of application on the respondent orders for production of documents, for inspection, for examinations for discovery, for the examination of witnesses who cannot attend the hearing by reason of sickness or other unavoidable cause, and for the examination of witnesses resident out of Ontario, may be made by the Board, or a member thereof, as the nature of the application may require, and upon such terms as to costs or otherwise as may be just.

NOTICE TO PRODUCE.

Notice to produce.

18. Either party may give the other notice in writing to produce any documents which relate to any matter in question between the parties which are in the custody, power or possession of said other party, and if such notice be not complied with, secondary evidence of such documents may be given.

NOTICE TO ADMIT.

Notice to admit.

19. A party may be called upon by any other party, by notice in writing to admit any document which requires to be proved, saving all just exceptions: and in default of notice to admit, the costs of proving the document shall not be allowed except where, in the opinion of the Board, the omission to give notice was a saving of expense.

THE RIGHT TO BEGIN.

The right to begin.

20. At the hearing of any application, the party commencing the proceedings shall begin, and after the evidence in defence is given, shall have the right to reply.

TIME FOR NOTICE OF MOTION.

Time for notice of motion.

21. There shall be at least two clear days between the service of a notice of motion and the day for hearing, unless the Board or a member thereof gives leave to serve short notice, and in the computation of such two clear days, Sundays and days on which the offices are closed shall not be reckoned.

No notice of motion shall be served unless an appointment has been first obtained from the Board or a member thereof for hearing the motion.

ENLARGING OR ABRIDGING TIME.

22. The Board may enlarge or abridge the time appointed by these rules for doing anything or taking any proceeding, upon such terms as may be just. Enlarging or abridging time.

VACATIONS.

23. No trial or hearing shall take place or motion be heard during the long vacation or the Christmas vacation observed by the High Court of Justice, unless otherwise directed by the Board in case of urgency, and such vacations shall not be reckoned in the computation of the times allowed by these rules for filing or delivering a notice of application or reply. Vacations.

COSTS.

24. The costs of and incidental to any proceeding before the Board, shall be in the discretion of the Board, and may be fixed at a sum certain or may be taxed by the secretary, on the High Court, County Court or Division Court scale as the Board may direct. Costs.

COMPUTATION OF TIME.

25. In all cases in which any particular number of days, not expressed to be clear days, is prescribed by these rules, the same shall be reckoned exclusively of the first day and inclusively of the last day, unless that day shall happen to fall on a holiday, in which case the time shall be reckoned exclusively of that day also. Computation of time.

AMENDMENTS.

26. Amendments, which, in the opinion of the Board, may be necessary for determining the real question at issue between the parties may be allowed at any time; and upon such terms as the Board in its discretion may deem just. Amendments.

TECHNICAL OBJECTIONS.

27. No proceeding before the Board shall be defeated or affected by any technical objection or by any objection based upon defects in form. Technical objections.

ADJOURNMENT.

28. The Board may from time to time adjourn any proceeding before it. Adjournment.

FORMAL ORDER OR JUDGMENT.

29. Unless otherwise ordered by the Board, the applicant or his solicitor shall prepare the formal order made by the Board and submit it to the respondent or his solicitor for approval, and in the event of the parties failing to agree on the form of the order, the same shall be settled by the secretary of the Board. Formal order or judgment.

and when settled, shall be engrossed in duplicate and left with the secretary to be signed and sealed and entered by him in the book kept for that purpose.

REGULATIONS.

Regulations.

30. The regulations in the First Schedule hereto shall have the same force and effect as these rules and to the same extent as if they had been incorporated in and formed part hereof.

FORMS.

Forms.

31. The forms in the Second Schedule hereto or forms to like effect may be used with such variations as circumstances or the nature of the application may require, and where no form is given in the said schedule, the forms used in connection with the Rules of Practice under the Judicature Act may be adopted. Office of the Board, Toronto, 11th July, A.D. 1906.

(Sgd.) JAMES LEITCH,
Chairman.

(Sgd.) A. B. INGRAM,
Vice-Chairman.

(Sgd.) H. N. KITTSO,
(Sgd.) H. C. SMALL,
Secretary.

FIRST SCHEDULE.—REGULATIONS.

REQUIREMENTS ON APPLICATION HAVING REFERENCE TO PLANS AND SURVEYS.—Section 59, Ontario Railway Act, 1906.

Requirements
on application
plans and
surveys.

No. 1.—Send to the secretary of the Board three copies of map or plan of the survey and levels made and taken of the lands through which the railway passes, showing its course and direction and the lands passed over and taken for the railway; also three copies of a book of reference which shall set forth:

(a) A general description of said lands.

(b) The names of the owners and occupiers thereof as far as can be ascertained.

(c) Everything necessary for the right understanding of such map or plan.

Scale of Map.—Not more than 6 miles to the inch.

The three sets of plans prepared are to be prepared in accordance with the "general notes" hereunder, as follows:

1st set: 1 plan, 1 profile, 1 book of reference. To be examined, sanctioned, and deposited with the Board.

2nd set: Same as 1st. To be examined, certified and returned for registration.

3rd set: Same as 1st. To be certified and returned to the company.

Scale, Plans: 400 feet to the inch.

Profiles: Horizontal, 400 feet; vertical 20 feet.

No. 2.—TO ALTER LOCATION OF LINE PREVIOUSLY SANCTIONED OR COMPLETED.—Section 59, subsec. 8, Ontario Railway Act, 1906.

Send to the secretary of the Board three sets of plans, profiles and books of reference as required in No. 1. To alter location.
Scale: Same as No. 1.

No. 3.—PLANS OF COMPLETED RAILWAY.—Section 59, Subsec. 15, Ontario Railway Act, 1906.

Send to the secretary of the Board within six months after completion three sets of plans and profiles of the completed road. Plans of completed railway.
1st set: To be filed with the Board.
2nd set: To be certified and returned to the company.
3rd set: For registration purposes.

Scale: Same as No. 1.

No. 4.—TO TAKE ADDITIONAL LANDS FOR MORE SPACE, SNOW PROTECTION, ETC.—Section 74, Ontario Railway Act, 1906.

Send to the secretary of the Board three sets of plans and documents as follows: To take additional lands.

1st set: 1 application certified and signed by the officers mentioned in subsec. 9 of section 59 of the Act: 1 plan, 1 profile, 1 book of reference. To be examined, certified and deposited with the Board.

2nd set: Same as 1st. For certificate and return for registration with duplicate authority.

3rd set: Same as 1st. For certificate and return to company with copy of authority.

Scale: Same as No. 1.

(N.B.—Ten days' notice of application must be given by the applicant company to the owner or possessor of the lands, and copies of such notice with affidavits of service thereof must be furnished to the Board upon such application).

No. 5.—BRANCH LINES.—Section 51, subsec. 6, Ontario Railway Act, 1906.

The same procedure, plans, profiles and books of reference as in No. 1. Branch lines.

Scale: Same as No. 1.

No. 6.—RAILWAY CROSSINGS AND JUNCTIONS.—Section 98, Ontario Railway Act, 1906.

Send to the secretary of the Board with an application, three sets of plans of both roads at the point of crossing. Railway crossing and junctions.

Scale—Plan: 100 feet to the inch.

Also three sets of plans and profiles of both roads on either side of the proposed crossing for a distance of two miles.

Scale-Plan: 400 feet to the inch.

Profile: Horizontal 400 feet; vertical 20 feet.

1st set: For approval and filing with the Board.

2nd and 3rd sets: To be certified and furnished to the respective companies concerned, with certified copy of order.

(N.B.—The applicant company must give ten days' notice of application to the company whose lines are to be crossed or joined and shall serve with such notice a copy of all plans and profiles and a copy of the application. Upon completion of the work application must be made to the Board for leave to operate the railway.)

No. 7.—HIGHWAY CROSSINGS.—Section 92, Ontario Railway Act, 1906.

Highway
crossings.

Send to the secretary of the Board, with an application, three sets of plans and profiles of the crossings.

Scale-Plan: 100 feet to the inch.

Profile: Horizontal 100 feet; vertical 20 feet.

1st set: For approval by and filing with the Board.

2nd and 3rd sets: To be furnished to the respective parties concerned, with a certified copy of the order of the Board approving the same.

The plan and profile shall show at least half a mile of the railway and 200 feet of the highway on each side of the crossing.

(N.B.—The applicant must give ten days' notice of application to the opposite party, and with such notice shall serve a copy of the plan and profile and of the application.)

No. 8.—BRIDGES, TUNNELS, VIADUCTS, TRESTLES, ETC., OVER 18 FT. SPAN.—Section 89, Ontario Railway Act, 1906.

Bridges,
tunnels,
viaducts,
trestles, etc.

Send to the secretary of the Board application and two sets of detailed plans, profiles, drawings and specifications.

1st set: For filing with the Board.

2nd set: To be certified and returned to the company, with certified copy of the order of the Board.

Bridges, tunnels, viaducts and trestles, over 18 feet span may be built in accordance with standard specifications and plans, submitted by the company and approved by the Board.

No. 9.—REQUIREMENTS ON APPLICATION TO CARRY LINES OR WIRES FOR THE CONVEYANCE OF ELECTRICITY FOR LIGHT, HEAT OR POWER, ACROSS A RAILWAY.—Subsec. 4, section 56, Ontario Railway Act, 1906.

Requirements
on application
to carry lines
or wires,
across railway.

Send to the secretary of the Board, with application, three copies of a plan and profile of the part of the railway proposed to be affected, showing the proposed location of such lines and wires and the works contemplated in connection therewith.

1st set: 1 plan, 1 profile. To be examined, sanctioned and deposited with the Board.

2nd set: Same as first. To be examined, certified and returned to applicant.

3rd set: Same as 1st. To be certified and given to company.

Scale-Plans: 400 feet to the inch.

Profiles: Horizontal 400 feet; vertical 20 feet.

Detailed plans, profiles, drawings and specifications may be blue, white or photographic prints.

GENERAL NOTES.

Plans (for Nos. 1 to 5) must show the right of way with General notes. lengths of sections in miles, the names of the terminal points, the station grounds, the property lines, the owners' names, the areas, and length and width of lands proposed to be taken, in figures (every change of width being given), the curves and the bearings, also all open drains, water courses, highways, and railways proposed to be crossed or affected.

Profile shall show the grades, curves, highway and railway crossings, open drains and water courses, and may be endorsed on the plan itself.

Books of reference shall describe the portion of land proposed to be taken in each lot to be traversed, giving numbers of the lots, and the area, length and width of the portion thereof proposed to be taken, and the names of owners and occupiers so far as they can be ascertained.

All plans, profiles and books of reference must be dated, and must be certified and signed by the President or Vice-President or General Manager, and also by the engineer of the company.

The plan and profile to be retained by the Board must be on linen, the copies to be returned may be either white, blue, or photographic prints.

All profiles shall be based, where possible, upon sea level datum.

All books of reference must be made on good thick paper, and in the form of a book with a suitable paper cover. The size of such books, when closed, shall be as nearly as possible $7\frac{1}{2}$ inches by 7 inches.

Books of reference may be endorsed on the plan.

Form of Book of Reference Required.

Railway Company.

Division.

Branch.

Book of reference to accompany location plan, showing lands required for railway purposes.

INTERLOCKING SYSTEM.

Regulations Governing Signals and Speed where Trains cross another Railway at Rail Level without stopping under Order of the Board.—Subsec. 3, sec. 124, Ontario Railway Act, 1906.

When the signal on distant semaphore post indicates caution, Interlocking system. a train passing it must be under full control, and come to a full stop before reaching the home post.

When the signal on the home post indicates danger, it must not be passed.

When the signals on the distant and home posts indicate safety, the train can proceed.

When clear signals are shown, the speed of passenger trains must be reduced to twenty miles, and freight trains to ten miles per hour, until the entire train has passed the crossing.

Regulations as to Requirements where the Board have ordered a Company to adopt and put in use an Interlocking Derailing and Signal System at Rail Level Crossings and Junctions.—Sub-sec. 6, sec. 98, Ontario Railway Act, 1906.

The plan and construction of an interlocking, signalling and derailing system to be used at rail level crossings and junctions of one railway by another must be arranged to conform to the following general rules:—

1. The normal position of all signals must indicate danger, derail points open and the interlocking so arranged that it will be impossible for the operator to give conflicting signals.

2. The derail points must be placed not less than 500 feet from point of intersection of the crossing of junction tracks, unless in special cases in which the Board authorizes in writing a less distance.

3. On side tracks the position of derail points may be located so as to best accommodate the traffic, and provide the same measure of safety indicated in foregoing rules.

4. On single track railways derail points, when practicable, should be on inside of curve, and on double track railways the derail points should be in outside rail of both tracks.

5. On double track railways back-up derails will be necessary.

6. Home signal posts must be 50 feet beyond point of derail, and the distance between home and distant signals must be not less than 1,200 feet. Signal post should be placed on engineman's side of track it governs.

7. Guard rails should be laid on outside of rail in which the derail is placed, and commence at least 6 feet toward home signal from point of derail, extending from thence toward crossing parallel with and 9 inches distant from track rail, for 400 feet.

8. In case there are crossovers, turnouts, or other connecting tracks involved in the general system, the movement of cars and trains upon which present an element of danger, which danger will be enhanced by the passage of trains on main tracks over crossings without stopping, and consequently at higher speed than would be the case without the permit sought, then, and in all cases, whether such enhanced danger be of collision between cars and trains of the same railway, or between cars or trains of different railways, it will be necessary, in addition to the protection of the main crossing, to provide by proper appliances, against any such increased collateral dangers in the same complete manner as is required in the case of the main crossing.

9. The arms and back lights of all signals should be visible to the signal-man in the tower. If from any cause the arm or light cannot be placed so as to be seen by the signal-man, a repeater or indicator should be provided in the tower.

10. Application for inspection of interlocking plant must be made to the Board accompanied by a plain diagram, showing location of crossing and position of all main tracks, sidings, switches, turnouts, etc.

The several tracks must be indicated by letters or figures, and reference made to each, explaining the manner of its use. The rate of grade on each main track must be shown, together with numbers of signals, derails, locks, etc., corresponding to levers in tower.

It is intended herein to state general rules, which will govern the construction of any proposed system of interlocking, after its adoption has been ordered by the Board. The traffic to be done, relative position and operation of intersecting lines, may require safeguards not mentioned herein.

The system of derailing, signalling, and interlocking must be connected and worked, and be complete in each particular before the Board will grant an order authorizing the operation of such interlocking, derailing, and signal system, or the crossing by the railway ordered to put on the system.

GENERAL REQUIREMENTS FOR INTERLOCKING AT DRAWBRIDGES.—
Subsec. 2, sec. 122, Ontario Railway Act, 1906.

Interlocking, signalling, and derailing system to be used at drawbridges must be arranged to conform to the following general rules:—

General
requirements
for interlocking
at drawbridges.

1. The normal position of all signals must indicate danger, derail points open, and the interlocking so arranged that it will be impossible for the operator to open the draw until the signals and derails are set against the approaching train movement.

2. Where the grade is practically level the derailing points shall be located not less than 500 feet from the ends of the bridge, but in case of a descending grade towards the bridge, the derailing point must be located at such distance from the bridge as to give the same measure of protection that is required for a level approach.

3. On single track railways, derail points when practicable, should be on the inside of the curve, and on double track railways, the derail points should be in outside rails of both tracks.

4. On double track railways back-up derails will be necessary.

5. Home signal posts must, when practicable, be located on the engineman's side of the track they govern, and should be not less than fifty (50) feet nor more than two hundred (200) feet in advance of the point they govern; the distant signals should be located not less than twelve hundred (1,200) feet in advance of the home signal, with which it is operated, and on the same side of the track. The distance signals should be distinguished by a notch cut in the end of the semaphore arm.

6. The arms and back-lights of all signals should be visible to the signal-man in the tower. If from any cause, the arm or light of any signal cannot be placed so as to be seen by the signal-man, a repeater or indicator should be provided in the tower.

7. Guard rails should be laid on outside of rail in which the derail is placed, and, commencing at least 6 feet in advance of derail, should extend thence toward the end of the bridge, parallel with and 9 inches from track rail, for not less than 400 feet.

8. Application for inspection must be made same as for railway crossings.

REGULATIONS AND SPECIFICATIONS FOR TELEPHONE OR TELEGRAPH WIRES CROSSING RAILWAY TRACKS.—Subsec. 5, sec. 56, Ontario Railway Act, 1906.

Regulations
and
specifications
for telephone
or telegraph
wires crossing
railway tracks.

1. Telephone and Telegraph Companies shall, at all times, at their own expense, maintain in good order and condition, and at the height called for by the specifications hereinafter set forth, the lines, wires and cables crossing the said railway so that at no time shall any damage be caused to the company owning, operating or using the said railway or to any person lawfully upon or using the same, and shall use all proper and necessary means to prevent any such wires and cables from sagging below said height.

2. Telephone and Telegraph Companies shall, at all times, wholly indemnify the company owning, operating or using the said railway of, from and against all loss, costs, damages and expense to which the said railway company may be put by reason of any damage or injury to persons or property caused by any of the said wires or cables, or any works or appliances herein provided for, not being erected in all respects in compliance with the terms and provisions of these regulations and specifications for the crossing, or if, when so erected, not being at all times maintained and kept in good order and condition, and in accordance with the terms and provisions hereof or any order or orders of the Board in relation thereto, as well as any damage or injury resulting from the imprudence, neglect or want of skill of any of the employees or agents of a Telephone or Telegraph Company.

3. No work shall at any time be done under these regulations and specifications in such a manner as to obstruct, delay or in any way interfere with the operation or safety of the trains or traffic on the said railway, nor until at least 48 hours' notice in writing has been sent by mail in a registered letter, postage prepaid, to the Railway Company at its head office and to the Board at its office in the City of Toronto.

4. Where, in effecting any such crossing, Telephone or Telegraph Company desires to erect poles between the tracks of the railway, before any work in connection with such crossing is begun, the Telephone or Telegraph Company shall give to the Railway Company owning, operating or using the said railway, at least forty-eight hours' prior notice thereof in writing, and the said Railway Company shall be entitled to appoint an inspector under whose supervision such work shall be done, and whose wages, at a rate not to exceed \$3.00 per day, shall be paid by the Telephone or Telegraph Company.

5. Where wires or cables to be carried across the railway are to be carried above existing telegraph or telephone wires and across a trolley wire or other high voltage wires, either within the spans to be constructed across the railway or within the spans next thereto on either side, such additional precautions shall be taken by the Telegraph or Telephone Company by the placing of guard wires or other protective devices as the Board shall consider necessary.

6. Nothing in this regulation shall prejudice or detract from the right of the company owning, operating or using the railway

to adopt at any time the use of electric or other motive power, and to place and maintain upon or under its right of way such poles, lines, wires, cables, pipes, conduits and other fixtures and appliances as may be necessary or proper for such purposes. Liability for the cost of any removal, change in location, or construction of the poles, lines, wires, cables, or other fixtures or appliances erected by a Telephone or Telegraph Company under the authority of the Ontario Railway Act, 1906, or of any order of the Board over the tracks of the said Railway Company rendered necessary by any of the matters referred to in this paragraph, shall be fixed by the Board on the application of any party interested.

7. Any dispute arising between a Telephone or Telegraph Company and the said railway as to the manner in which the said wires and cables are being erected, maintained, used or repaired shall be referred to the Board, whose decision shall be final.

8. The wires and cables of a Telephone or Telegraph Company shall be erected and maintained across the said railway in accordance with these regulations and the specifications following.

SPECIFICATIONS.

Poles to be located, wherever possible, at a distance from the rail not less than equal to the length of the poles used. Location of poles.

Poles must not under any circumstances if the railway is operated by steam be placed less than 12 feet from either rail of a main line, and if operated by electricity, must not be placed less than 6 feet from either rail of a main line or less than 6 feet from either rail of a siding. At loading sidings sufficient space to be left for a driveway.

Poles of 25 feet to 34 feet in length to be set not less than 5 feet, 35 feet, 5½ feet, 36 feet to 50 feet, not less than 6 feet, and over 50 feet, 7 feet in solid ground. Poles with side strains to be reinforced. Poles to be at least six inches in diameter at top. In soft ground poles must be set so as to obtain the same amount of rigidity as would be obtained by the above specifications for setting poles in solid ground. Setting of poles.

Span must be as short as possible, consistent with the rules of locating and setting of poles. Length of span.

The pole at each side of a railway must be fitted with cross arms of dimensions not less than 3 x 4 inches, equipped with 1½ inch hardwood pins nailed in arm; arm to be properly fastened to the pole in a girth by not less than two lag screws ½ x 7 inches or by ½ inch machine bolt through the pole; arms carrying more than two wires or carrying a cable must be braced by two iron braces fastened to the arm by ¾ inch carriage bolts, and to the pole by a lag screw 5 x ¾ inches. Fitting of poles.

The lowest wire must not be less than 25 feet from top of rail, and 4 feet above or under feed wires, and 8 feet above trolley wires, for spans up to 145 feet, 2½ feet additional clearance must be given for every 20 feet additional length of span. Wires crossing over or under other telegraph or telephone wires erected along the railway right of way must clear either 3 over or 3 feet under. Height of wires.

Where open lines are strung across steam railway tracks, the stretch must consist of copper wire, to be not less than No. 13 New British Standard Gauge, .091 inches diameter. Wire to be tied Wires.

to the insulator on each of the double cross arms of a soft copper wire, of same dimensions as line wire, not less than 20 inches in length.

Where open lines are strung across electric railway tracks the stretch may consist of galvanized iron wire not less than No. 14 standard gauge, iron wire to be tied to the insulator on cross arms by a tie wire of same dimensions as line wire with not less than 3 half turns made with pliers on each side of insulator.

Copper wire to be ended on transposition insulator at the poles on each side of Electric Railway.

Where a number of rubber covered wires are strung across railway tracks they may be made up into a cable by being twisted on each other or sewn with Marline, which must be tied every 3 feet and the whole securely fastened to the poles by Marline. Guy wires crossing railway tracks must consist of either 7 stranded No. 16 or No. 13 galvanized steel wire.

Guards.

An iron hook guard to be placed on the end of each cross arm, or a copper wire loop guard over each wire and fastened by staples to the cross arm.

Cable.

Where cables are strung across tracks they must be carried on a suspension wire of not less than 7 strands of No. 13 galvanized steel wire, which when cross arms are used will be attached to a $\frac{3}{4}$ inch iron hook, or when fastened to poles, a malleable iron messenger hanger bolted through the poles, the cable to be attached to the suspension wire by cable clips not more than 20 inches apart.

Rubber insulated cables of less than $\frac{3}{4}$ inch diameter may be carried on a suspension wire of not less than 7 strands of No. 16 galvanized steel wire.

Regulations
and
specifications
for under-
crossings.

1. The line or lines, wire or wires, shall be carried across the railway in accordance with this regulation by a pipe or pipes, conduit or conduits, and each shall, for the whole width of the right of way adjoining the highway, be laid at the depth called for by, and shall be constructed, maintained, renewed and repaired according to, the specification hereinafter set forth.

2. All work in connection with the laying, maintaining, renewing or repairing of each pipe or conduit, and the continued supervision of the same shall be performed by, and all cost and expenses thereby incurred be borne and paid by, the telephone or telegraph company, but no work shall at any time be done in such a manner as to obstruct, delay or in any way interfere with the operation or safety of the trains or traffic on the said railway.

3. The telephone or telegraph company shall, at all times, maintain each pipe or conduit in good condition and so that at no time shall any damage be caused to the property of the railway company, or any of its tracks be obstructed, or the usefulness or safety of the same for railway purposes be impaired, or the full use or enjoyment thereof by the said railway company be in any way interfered with.

4. Before any work of laying, renewing or repairing any pipe or conduit is begun the telephone or telegraph company shall give to the railway company at least forty-eight hours' prior notice thereof, in writing, accompanied by a plan of the part of the railway to be affected, showing the proposed location of such pipe or conduit and works contemplated in connection therewith, and the

said railway company shall be entitled to appoint an inspector to see that the telephone or telegraph company, in performing said work, complies, in all respects, with the specification hereinafter set forth and whose wages, at a rate not exceeding \$3.00 per day, shall be paid by the telephone or telegraph company.

5. The telephone or telegraph company shall, at all times, wholly indemnify the company owning, operating or using the said railway of, from and against all loss, costs, damage and expense to which the said railway company may be put by reason of any damage or injury to persons or property caused by any pipe or conduit, or any works or appliances not being laid and constructed in all respects in compliance with the specification hereinafter set forth, or if, when so constructed and laid, not being at all times maintained and kept in good order and condition and in accordance therewith, or any order or orders of the Board in relation thereto, as well as any damage or injury resulting from the imprudence, neglect or want of skill of any of the employees or agents of the telephone or telegraph company.

6. Nothing in this regulation shall prejudice or detract from the right of any company owning, operating or using the said railway to adopt, at any time, the use of electric or other motive power and to place and maintain upon or under the said right of way such poles, wires, pipes and other fixtures and appliances as may be necessary or proper for such purpose.

Liability for the cost of any removal, change in location, or construction of the pipes, conduits, wires or cables constructed or laid by the telephone or telegraph company under authority of the Ontario Railway Act, 1906, or of an order of the Board, rendered necessary by any of the matters referred to in this paragraph, shall be fixed by the Board on the application of any party interested.

7. Any dispute arising between the telephone or telegraph company and any company owning, using or operating said railway as to the manner in which any pipe or conduit, or any works or appliances hereinbefore provided for, are being laid, maintained, renewed or repaired, shall be referred to the Board, whose decision shall be final.

SPECIFICATION.

Vitrified clay, cement pipe, creosoted wood, iron pipe, or fibre Duct.
may be used.

The excavation must be of sufficient depth to allow the top duct Depth.
to be at least three feet in the case of a steam railway and 18 inches in the case of an electric railway below the bottom of the ties of the railway tracks.

The duct to be laid on a base of three inches in the case of a Laying.
steam railway, and in the case of an electric railway on two inches of concrete, mixed in proportion, one of Portland cement, three of sand, and five of broken stone or gravel.

Where stone is used such stone not to be of greater size than will permit of its passage through a one-inch ring.

After the ducts are laid, the whole to be encased to a thickness of three inches in the case of a steam railway, and two inches in the case of an electric railway on top and sides in concrete, mixed in the same proportion as above.

Filling in.

The excavation must be well filled in slowly and well tamped on top and sides.

Guard.

The excavation must be at all times safely protected.

ACCIDENTS: REGULATIONS UNDER AND IN PURSUANCE OF SECTION 237 OF "THE ONTARIO RAILWAY ACT, 1906."

Accidents.

Every company upon the happening of an accident shall give to the Ontario Railway and Municipal Board notice thereof in writing by delivering the same at the office of the Board in the City of Toronto or by mailing it, postage prepaid, in a registered letter addressed to the Board.

Such notice shall contain a statement signed by a duly authorized officer of such company, setting forth the information and particulars hereinafter mentioned.

Such statement shall be divided into paragraphs, each of which shall include and refer to one (or one group) only of the numbered particulars hereinafter mentioned, and the paragraph referring to each respective numbered particular shall bear the number corresponding to the number hereinafter given for each such particular.

The numbers of paragraphs and the particulars to which each shall refer as aforesaid, are as follows:—

1. Name or names of company or companies concerned in accident.

2. Number of train, engine, car or motor.

3. Date and time of accident.

4. Nature of accident.

5. Extra location.

6. Name in full, address and legal addition of each person injured or killed.

7. Age.

8. Married or single.

9. Passenger, employee or other.

10. If employee, length and nature of service with dates and periods of different occupations (if more than one).

11. If employee, character, experience, skill and fitness with respect to occupation at time of accident.

12. How engaged at time of accident, and how long on duty.

13. Cause of accident, how same occurred, with full particulars and details and diagram if required.

14. Persons in charge, with full names, addresses and the particulars referred to in paragraphs 10, 11 and 12.

15. Result to person and particulars of injury.

16. Result to property, including amount of damage.

17. Names and addresses of all persons present at, or eye witnesses of, the accident.

18. What investigation (if any) and result of same.

19. Verdict (if any).

The Board reserves the right to require such further and other details, particulars, maps, plans, profiles, documents, models and information or illustration of any kind as the nature of the accident and a full understanding thereof may suggest or require.

In pursuance of subsection 2 of section 237 of said Act, the Board declares that all such information so given in pursuance of this regulation shall be privileged.

SECOND SCHEDULE—FORMS.

THE ONTARIO MUNICIPAL AND RAILWAY BOARD.

Form No. 1.

BETWEEN

AND

*Applicant.**Respondent.*

NOTICE OF APPLICATION.

1. The applicant is (here give a general description of the Notice of application.
applicant).

2. The respondent is (here give a general description of the respondent).

3. (Here follows the complaint or application.)

4. (Here follows the nature of the relief or remedy sought.)

5. This application will be heard by the Board after ten days from the service hereof, at such time and place and in such manner as the Board may order and direct.

6. This notice is given by _____ of the _____
of _____ in the county of _____ solicitor
for the applicant (or this notice is given by _____
of the _____ the applicant in person).

Signatures: Solicitor's or Applicant's.

Form of Application where there is no Opposite Party.

Form No. 2.

THE ONTARIO RAILWAY AND MUNICIPAL BOARD.

In the matter of the application of _____
of the _____ of _____ in the county of _____
of _____ for an order for _____

The applicant hereby applies to the Board for an order for _____
(here set forth the nature of the application and order asked for).

This application is made by _____ of the _____
of _____ in the county of _____
solicitor for the applicant: (or this application is made by the
applicant in person).

Signature of Solicitor or Applicant.

REPLY.

Style of cause as in Form No. 1.

1. The reply of the above named respondent to the notice of Form No. 3.
application of the above named applicant. Reply.

2. The respondent admits paragraphs numbered one, two or three (as the case may be) of the notice.

3. The respondent says that (here set forth reply).

4. The respondent says that the applicant is not entitled to the relief or remedy sought (or he is only entitled to the following relief or remedy (as the case may be).

5. This reply is made by _____ of
solicitor for the above named respondent: (or this reply is made
by _____ of _____ the respondent in person).

Signature of Solicitor or Respondent (as the case may be).

FORM OF ORDER FOR PRODUCTION.

Style of Cause, same as in Form No. 1.

Form No. 4.

Upon the application of the

It is ordered, that the

do, within ten days after the services of this order, make discovery on oath of the documents which are or have been in possession or power relating to any matters in question in this application, and to produce to and deposit the same with the Secretary of the Board at Toronto for the usual purposes.

Dated this

day of

A.D. 190

Form No. 5.

The schedule to be divided into two parts when the deponent objects to the production of any of the documents.

FORM OF AFFIDAVIT AS TO PRODUCTION OF DOCUMENTS.

Style of Cause, same as in Form No. 1.

The first part is to contain the documents in the deponent's possession to the production of which he does not object.

The second part is to contain the documents, if any, in the deponent's possession to the production of which he does object.

Here state upon what ground the objection is made, and verify the facts as far as may be.

State when.

Here state what has become of last mentioned documents and in whose possession they are now.

1. I, _____ the above named _____ make oath and say as follows:—

1. I have in my possession or power the documents relating to the matters in question in this application set forth in the first and second parts of the First Schedule hereto.

2. I object to produce the said documents set forth in the second part of the First Schedule hereto.

3. That

4. I have had, but have not now, in my possession or power the documents relating to the matters in question in this application set forth in the Second Schedule hereto.

5. The last mentioned documents were last in my possession or power on,

6. That

7. According to the best of my knowledge, information and belief, I have not now and never had in my possession, custody or power, or in the possession, custody or power of my solicitors or agents, solicitor or agent, or in the possession, custody or power of any other person or persons on my behalf, any deed, account, book of account, voucher, receipt, letter, memorandum, paper or writing, or any copy of or extract from any such document, or any

Sworn at _____ of _____ }
in the _____ day of _____ }
this _____ day of _____ }
one thousand nine hundred and _____ }
Before me _____ }
A Commissioner, etc.

Take notice that you are hereby required to produce and shew to the Board at the hearing of this application, all books, papers, letters, copies of letters and other writings and documents in your custody, possession or power containing any entry, memorandum or

COPIES.

DESCRIPTION OF DOCUMENTS.	DATES.	Original or Duplicate served, sent or delivered, when, how and by whom.

SUBPŒNA.

THE ONTARIO RAILWAY AND MUNICIPAL BOARD.

BETWEEN

AND

Applicant,

Respondent.

Edward the Seventh, by the Grace of God of the United Kingdom of Great Britain and Ireland, and of the British Dominions beyond the Seas, King, Defender of the Faith, Emperor of India,
To

Form No. 9.

Greeting :

We command you to attend before the Board at
on day the day of A.D. 19 ,
at the hour of o'clock in the noon, and so on from
day to day until the above matter is heard, to give evidence on
behalf of , and also to bring with you
and produce at the time and place aforesaid all

Subpœna.

Witness, James Leitch, Esq., K.C., Chairman of our said
Board, the day of A.D. 19 , in the
 year of Our Reign.

(To be endorsed) O. R. & M. B.

vs.

Subpœna: This writ is issued by of the
of in the County of
solicitor for the
(or by the in person).

Issued from the office of The Ontario Railway and Municipal
Board at the City of Toronto, in the County of York, and the Pro-
vince of Ontario.

Secretary.

FORM OF FINAL ORDER.

THE ONTARIO RAILWAY AND MUNICIPAL BOARD.

The day of

A.D. 19 .

BETWEEN

AND

Applicant.

Form No. 10.

Respondent.

Upon the application of the above named applicant in presence
of the applicant and respondent upon hearing the evidence adduced
on behalf of the applicant and respondent and upon hearing coun-
sel for the applicant and respondent, (or upon hearing the appli-
cant and respondent in person, as the case may be).

Before
James Leitch,
Esq., K.C.,
Chairman;
A. B. Ingram,
Esq., Vice-
Chairman;
H. N. Kittson,
Esq., Member.

The Board orders

(Here set forth what the Board orders.)

THE ONTARIO RAILWAY AND MUNICIPAL BOARD.

MEETING AT BELLEVILLE.

Before:—

His Honour JAMES LEITCH, K.C.,
Chairman,
His Honour A. B. INGRAM, and
His Honour H. N. KITTSOY,
Commissioners.

Tuesday, the 19th day of
June, A.D. 1906.

In the matter of the application of the Corporation of the City of Belleville for the approval and confirmation of By-law No. 1288 of the Municipal Council of the Corporation of the City of Belleville finally passed the 18th day of June, A.D. 1906.

Upon the application of William Charles Mikel, Counsel for the Corporation of the City of Belleville and upon hearing the evidence adduced and what was alleged by Counsel aforesaid, and it appearing that the aforesaid By-law was finally passed by three-fourths of the Municipal Council of the Corporation of the City of Belleville on the 18th day of June, A.D. 1906, and that the improvements and extensions proposed are necessary and that sufficient additional revenue will be derived therefrom to meet the annual special rate required to pay the new debt and interest therefor,

It is ordered that By-law No. 1288 of the Municipal Council of the Corporation of the City of Belleville finally passed the 18th day of June, A.D. 1906, by three-fourths of the members of the said Council to provide for issuing twenty-five thousand dollars (\$25,000.00) of debentures to improve and extend the Gas Works System of the City of Belleville be and the same is hereby approved and confirmed.

(Sgd.) JAMES LEITCH,
Chairman of the Ontario Railway and Municipal Board.

THE ONTARIO RAILWAY AND MUNICIPAL BOARD.

Wednesday, the 20th day of June, A.D. 1906.

In the matter of the application of the Municipal Corporation of the Town of Gananoque for the approval of the investment of certain sinking funds.

Upon the petition of the Municipal Corporation of the Town of Gananoque, upon reading the said petition, the affidavit of J. Arthur Jackson and Freeman Britton, the certificates of the Managers at Gananoque of the Merchants' Bank of Canada and The Bank of Toronto, By-law No. 439 of said Corporation, and the proposed by-law of said Corporation to invest \$15,000 from the sinking funds of the said Municipality in debentures issued by the said Municipality under said By-law No. 439, and upon hearing Counsel for the petitioners,

It is ordered, pursuant to the provisions of section 420 of "The Consolidated Municipal Act, 1903," and of section 53 of "The Ontario Railway and Municipal Board Act, 1906," that the proposed by-law of the Municipal Council of the Town of Gananoque providing for the invest-

ment of fifteen thousand dollars of the sinking funds of said Municipality in the purchase of debentures issued by said Municipality under said By-law No. 439 be and the same is hereby approved, said sum of fifteen thousand dollars to be taken from the sinking funds now standing to the credit of the by-laws hereinafter respectively named, that is to say:—

(a) From the sinking funds of By-law No. 260.....	\$6,280 00
(b) From the sinking funds of By-law No. 332.....	3,020 00
(c) From the sinking funds of By-law No. 335.....	618 00
(d) From the sinking funds of By-law No. 412.....	5,082 00
	<hr/>
	\$15,000 00

(Sgd.) JAMES LEITCH,
Chairman of the Ontario Railway and Municipal Board.

THE ONTARIO RAILWAY AND MUNICIPAL BOARD.

MEETING AT TORONTO.

Before:—

His Honour JAMES LEITCH, K.C.,
Chairman,
His Honour A. B. INGRAM, and
His Honour H. N. KITTSON,
Commissioners.

Wednesday, the 4th day of
July, A.D. 1906.

In the matter of the application of the Corporation of the City of Stratford for the approval and confirmation of its by-law to raise \$18,000 to extend and improve the Water Works of the said City of Stratford.

Upon the application of the Corporation of the City of Stratford for an Order approving and confirming By-law No. 1277 of the City of Stratford, passed on the 19th day of June, 1906, to raise the sum of \$18,000 for the purpose of extending and improving the Water Works of the City of Stratford; upon reading the said by-law, and the declaration of William John Ferguson and Robert Rigg Lang, and upon hearing *viva voce* evidence adduced, and upon hearing Counsel for the said Corporation, no one appearing to oppose the said application, and it having been shown to the satisfaction of the said Board that the extensions and improvements intended to be made are necessary, and that a sufficient additional revenue will be derived therefrom to meet the annual special rate required to pay the debt and interest, and on the final passing of the said by-law, three-fourths of all the members of the Council having voted in favor of the same:

It is ordered that the said By-law No. 1277 of the City of Stratford be and the same is hereby approved and confirmed.

(Sgd.) JAMES LEITCH,
Chairman of the Ontario Railway and Municipal Board.

THE ONTARIO RAILWAY AND MUNICIPAL BOARD.

Before:—

His Honour JAMES LEITCH, K.C.,
His Honour A. B. INGRAM, and
His Honour H. N. KITTSOX,

} Monday, the 9th day of
July, A.D. 1906.

In the matter of the application of the Corporation of the City of Niagara Falls for the approval and confirmation of By-law No. 161 of the Municipal Council of the Corporation of the City of Niagara Falls finally passed the 11th day of May, A.D. 1906.

Upon the application of Fred. Campbell McBurney, Counsel for the Corporation of the City of Niagara Falls, and upon hearing the evidence adduced and what was alleged by Counsel aforesaid, and it appearing that the aforesaid by-law was finally passed by three-fourths of the Municipal Council of the Corporation of the City of Niagara Falls on the 11th day of May, A.D. 1906, and that the improvements and extensions proposed are necessary, and that sufficient additional revenue will be derived therefrom to meet the annual special rate required to pay the new debt and interest therefor,

It is ordered that By-law No. 161 of the Municipal Council of the Corporation of the City of Niagara Falls, finally passed the 11th day of May, A.D. 1906, by three-fourths of the members of the said Council, to provide for issuing twenty thousand seven hundred and fifty-eight dollars (\$20,758.00) of debentures to improve and extend the electric light plant of the City of Niagara Falls be and the same is hereby approved and confirmed.

(Sgd.) JAMES LEITCH,
Chairman of the Ontario Railway and Municipal Board.

THE ONTARIO RAILWAY AND MUNICIPAL BOARD.

Before:—

His Honour JAMES LEITCH, K.C.,
His Honour A. B. INGRAM, and
His Honour H. N. KITSON,

} Monday, the 9th day of
July, A.D. 1906.

In the matter of the application of the Corporation of the City of Niagara Falls for the approval and confirmation of By-law No. 160 of the Municipal Council of the Corporation of the City of Niagara Falls finally passed the 11th day of May, A.D. 1906.

Upon the application of Fred. Campbell McBurney, Counsel for the Corporation of the City of Niagara Falls, and upon hearing the evidence adduced and what was alleged by Counsel aforesaid, and it appearing that the aforesaid by-law was finally passed by three-fourths of the Municipal Council of the Corporation of the City of Niagara Falls on the 11th day of May, A.D. 1906, and that the improvements and extensions proposed are necessary, and that sufficient additional revenue will be derived therefrom to meet the annual special rate required to pay the new debt and interest therefor;

It is ordered that By-law No. 160 of the Municipal Council of the Corporation of the City of Niagara Falls, finally passed the 11th day of May, A.D. 1906, by three-fourths of the members of the said Council, to provide for issuing eight thousand three hundred dollars (\$8,300.00) of debentures to improve and extend the Water Works System in the City of Niagara Falls be and the same is hereby approved and confirmed.

(Sgd.) JAMES LEITCH,
Chairman of the Ontario Railway and Municipal Board.

THE ONTARIO RAILWAY AND MUNICIPAL BOARD.

Before :—

JAMES LEITCH, Esq., K.C.,
Chairman,
A. B. INGRAM,
Vice Chairman, and
H. N. KITSON, Esq.,
Commissioners.

Thursday, the 12th day of
July, A.D. 1906.

In the matter of the application of the Huntsville and Lake of Bays Railway Company for approval of the location of the line of their railway.

Upon the application of the Huntsville and Lake of Bays Railway Company for an Order approving of the location of the line of their railway, for the construction of which a subsidy was granted under an Act of the Legislature of the Province of Ontario, being 4 Edward VII., Chapter 18;

Upon examination of the plans and profiles of said line filed in the Department of Public Works for the Province of Ontario;

Upon reading the amendment to the said Act passed by the said Legislature, being 6 Edward VII., Chapter 19, Sec. 39;

Upon hearing the *viva voce* evidence of R. P. Fairbairn, Engineer of the said Department of Public Works, and upon hearing Counsel for the said Company, no one appearing to oppose the said application;

And it having been shown to the satisfaction of the Board that the location of the said line is the best procurable, having regard to the contiguity of the lakes which it connects and the difference in their respective levels and other engineering difficulties;

And it appearing also that no directions as to stations or stoppages on said line have been made or given by the railway committee of the Executive Council of Ontario, and that the station accommodation as now provided is sufficient for the requirements of the said line and for the convenience of the travelling public;

And it further appearing that at the time of the construction of the said railway, rails suitable therefor and manufactured in Ontario were not procurable and that the rails were purchased in Canada;

It is ordered that the location of the said railway, the location and number of the stations thereon, the intervals at which stoppages are made, and the purchase of the rails for the said railway be and the same are hereby approved.

(Sgd.) JAMES LEITCH,
Chairman of the Ontario Railway and Municipal Board.

THE ONTARIO RAILWAY AND MUNICIPAL BOARD.

In the matter of the accident of the Hamilton Radial Railway, which took place in the City of Hamilton on the twenty-first day of June, 1906.

REPORT OF THE ONTARIO RAILWAY AND MUNICIPAL BOARD.

The Board having been notified of a collision which took place between a switching Engine of the Grand Trunk Railway and a trolley car of the Hamilton Radial Railway on the 24th day of July, proceeded to Hamilton to investigate the accident, and submits the following report:

The investigation was held in the Court House on the 24th day of July at 11 a.m.

The Grand Trunk Railway were represented by Mr. J. W. Nesbitt, K.C. The Hamilton Radial Railway by Gabriel Levy, Esq.

R. A. Pringle, Esq., appeared for the Attorney-General, and

George A. Kingston, Esq., for the Employers' Liability Insurance Corporation.

The following witnesses were examined on oath, in reference to the accident:

W. Kettlewell, conductor of the Hamilton Radial Railway.

Frank Wright, a resident of Hamilton living at 110 West Ave., and formerly a conductor of the Hamilton Radial Railway.

Wm. Nugent, watchman and signalman at the corner of Wilson and Ferguson Streets.

Edward Herrick, fireman on engine No. 9 of the Grand Trunk Railway.

John Gibson, superintendent of the Hamilton Radial Railway.

Mistress Della Elliot, a passenger on the Radial car at the time of the accident, and a resident of Hamilton Beach.

Peter J. Carse, lithographer, a passenger.

William Pitt, engineer on engine No. 9 of the Grand Trunk Railway, and

Martin O'Connor, switchman of the Grand Trunk Railway.

In addition to the examination of the above witnesses a survey was made by the full Board, of the point where the collision took place.

The accident occurred at the intersection of Ferguson Ave. and Wilson St., in the City of Hamilton at nine o'clock in the forenoon of the 21st day of June, 1906, between engine No. 9 of the Grand Trunk Railway in charge of William Pitt, engineer, and car No. 93 of the Hamilton Radial Railway in charge of Douglas Kettlewell, conductor, and William Strongman, motorman.

At the time of the accident there were about thirty passengers on trolley car No. 93. Of these, three or four were slightly injured. At the point of collision, at the junction of Ferguson Avenue and Wilson St., the tracks of the Hamilton Radial Railway are laid in the centre of Wilson Street, and the tracks of the Grand Trunk Railway in the centre of Ferguson Avenue. Both tracks conform to the grade of the streets.

The crossing is at rail level. The grades of both tracks at the point of collision are practically level.

Radial car No. 93 was running in a westerly direction on Wilson St., Grand Trunk engine No. 9 in a southerly direction on Ferguson Avenue. There are buildings on both sides of Wilson St. and Ferguson Ave. which obstruct the view until within a few feet of the railway crossing at the intersection of the streets. At the south-west corner of Wilson St. and Ferguson Ave. a derailing device attached to derailing points on the Radial Railway, together with a semaphore, has been installed by the Hamilton Radial Railway.

The derailing points on the Hamilton Radial line are about 75 feet from each side of the diamond. There are no derailing points on the Grand Trunk line. The derailing points are operated by the watchman in charge of the semaphore. When the semaphore is set at danger against the Grand Trunk, the derailing points are closed and the radial line is open for the passage of trolley cars.

Car No. 93 of the Hamilton Radial line was running from Burlington Beach behind another Radial car loaded with passengers, which had crossed the crossing about a minute or two in advance of 93. There was another car of the Hamilton Radial behind car No. 93, also loaded with passengers. The Grand Trunk trains have the right of way at this crossing. Engine No. 9 of the Grand Trunk, at the time of the accident, was engaged in switching freight cars from the west yard to the east. The west yard is situated about 55 or 60 yards from the crossing. Grand Trunk engine No. 9 had attached to it at the time of the accident 5 or 6 freight cars. In order to clear the switch for the purpose of backing up with more than 5 cars, it is necessary to cross the diamond. The semaphore was set at danger against the Grand Trunk engine. As already stated, three trolley cars of the Radial had arrived at the crossing, and before setting the semaphore the watchman looked down the Grand Trunk line and saw that the track was clear. The first trolley car on the radial, waiting to cross, then made the crossing, about a minute in advance of the second car to which the accident happened. When the second car, being the one to which the accident happened, was crossing the diamond, Grand Trunk engine No. 9, which was running very slowly, and at not more than 4 miles an hour, ran into it, derailing and partly tilting it over, causing slight injury to 3 or 4 passengers.

Immediately before the accident Wm. Pitt, engineer in charge of Grand Trunk engine No. 9, was looking to the rear of his train, for signals from the switchman in charge, and did not see either the semaphore or the Radial car 93 as it was crossing the diamond. His attention was called to the Radial car by Fireman Herrick, but only when the engine was within a few feet of the Radial car.

He immediately reversed his engine and applied his steam brake, but it was too late to avoid the impact.

Fireman Edward Herrick was sitting on the fireman's side of the engine ringing the bell and looking ahead when he saw the Radial car, but he did not warn the engineer in time to prevent the accident.

In placing the responsibility for the accident, the Board, upon the evidence adduced, is of opinion that the Grand Trunk employees were to blame.

The point at which the accident took place is extremely dangerous. It is a rail level crossing at the intersection of two streets upon which there is considerable street traffic. The Radial cars passing over this crossing generally carry a large number of passengers going to and from Burlington Beach.

This crossing, besides being used for switching engines of the Grand Trunk, is crossed by two passenger trains of that railway going north and south twice a day. There are no crossing signals at this point other than the semaphore. The derailing switch applies only to the Radial Railway. The signalman employed by the Radial Company was not constantly in charge of the semaphore, but, during his absence, the conductors on the Radial trolley cars before crossing the diamond went forward to see that the track was clear. The manager of the Radial Railway Company informed

the Board that since the accident the Company had adopted this precaution of having the conductor on the trolley car go forward to see that the crossing was clear, even while the signalman was in charge of the semaphore. The Board recommends that this precaution be continued, and that no car of the Radial Company will be permitted to cross the diamond without the conductor taking this precaution.

As this Board has no jurisdiction over the Grand Trunk Railway at this point it does not take upon itself to make any recommendation so far as that Company is concerned, but would leave it to the City of Hamilton to bring the matter before the Dominion Railway Commission if they are so advised. The Board have directed that copies of this report and recommendation be sent to the corporation of the City of Hamilton, to the Radial Railway Company, the Grand Trunk Railway Company, and to the Dominion Railway Commission.

Dated at the office of the Ontario Railway and Municipal Board, Toronto, Aug. 3rd, 1906.

(Sgd.) JAMES LEITCH,

The Chairman of the Ontario Railway and Municipal Board.
To the Hon. J. J. Foy, Attorney-General, Toronto.

THE ONTARIO RAILWAY AND MUNICIPAL BOARD.

In the matter of an accident to Victor Newman, on the Hamilton Street Railway, which took place on the 5th day of July, 1906, on the corner of Bay and Herchimer Streets in the City of Hamilton.

R. A. Pringle, Esq., appeared for the Attorney General. Alex. Lewis, Esq., appeared for Victor Newman, and Geo. A. Kingston, Esq., appeared for the Employees' Liability Assurance Corporation.

The following witnesses were examined under oath in reference to the accident:—

Thomas Fagan, Conductor of car 101 of the Hamilton Street Railway.

Miss Lilly Bristol, residing on the corner of Bay and Herchimer Sts.

Miss Agnes Street, residing at 139 Hueston St., N.

Miss Gertrude Green, residing at 139 Hueston St., N.

Henry Chas. Edward, residing at 211 Robinson St.

Richard Nugent, Motorman of car 101, residing at 54 Yonge St., and Thomas Hunt, farmer and milkman of Beverely.

The accident took place about 9.35 a.m. on the 15th of July, 1906, at the intersection of Bay and Herchimer Sts., in the City of Hamilton. Car number 101, of the Hamilton Street Railway was in charge of Thomas Fagan, conductor, and Richard Nugent, motorman; and was running west on Herchimer Street.

When about 25 or 30 feet from the intersection of Herchimer and Bay Streets, Victor Newman, a child of about 5 years of age, crossed the street diagonally from the south side of Herchimer Street to go across Bay Street. When he reached the north track, upon which car number 101 was running, Motorman Nugent saw him standing between the rails. Conductor Fagan saw the boy at a distance of twenty-five or thirty feet from where he was struck. The motorman both rang the bell and shouted to the boy. He also reversed his power and dropped the fender. Notwithstanding this the fender struck the boy, passed over him, and the wheel of the car lacerated

his left leg, which rendered amputation, above the knee, necessary. After striking the child the car ran about one hundred feet past where he was struck.

It is clear from the evidence that the car, at the time of the accident, was being run at a very high and excessive rate of speed. If the car had been running slowly, as stated by Conductor Fagan and Motorman Nugent, the accident could not very well have happened, as there would have been no difficulty in stopping the car between the time the motorman first saw the child, and where the child was struck.

The Board are of opinion that the conductor and motorman were to blame for the accident, and if at present in the employment of the Company they should be suspended for a period of thirty days, and the Board order the same accordingly.

From personal observation it is clear to the Board that the cars of the Company are operated very carelessly, and at times run at too high a rate of speed, consistent with the safety of the public. It was observed by members of the Board that in several instances cars were run at such a high rate of speed that they frequently ran long distances past the points where they should stop for the purpose of taking on passengers.

The Board recommend that immediate steps be taken by the Company to compel a more careful operation of their cars by their employees.

Dated at the office of the Ontario Railway and Municipal Board, Toronto, 3rd August, 1906.

(Sgd.) JAMES LEITCH,

Chairman of the Ontario Railway and Municipal Board.

To Hon. J. J. Foy, Attorney-General, Toronto.

THE ONTARIO RAILWAY AND MUNICIPAL BOARD.

In the matter of the complaint of the employees of the London Street Railway.

On the 25th of July, 1906, the Chairman of the Board received the following telegram from J. C. Judd, Esq., Mayor of the City of London:

"James Leitch, Chairman, Railway and Municipal Board, Toronto. I have received reliable information that a strike is seriously threatened on the London Street Railway, and request that action be taken by your Board under section 59 of the 'Railway and Municipal Board Act, 1906'. Immediate action is imperative. Please answer. J. C. Judd, Mayor."

On receipt of the above telegram, the chairman of the Board replied by telephone that the Board would visit London, on the 27th of July.

On the 27th of July, the Chairman of the Board telegraphed the Mayor as follows:—"Have the leaders of the Street Railway employees meet us at the Tecumseh House on arrival of the C.P.R. train."

In pursuance of last mentioned telegram, upon the arrival of the Board at London, one of the leaders of the strikers met the Board at the Tecumseh House and verbally made a statement of the men's grievances, and the cause of the strike. The Board urged as strongly as possible, upon the leaders present, the advisability of the men resuming their employment, pending an investigation by the Board. This the leader could not agree to, without consulting the men on strike, and he appointed three o'clock for a further meeting with the Board. In the meantime, at the instance of the Board,

the Board were waited upon by the Officials of the Street Railway Company, when the whole situation was discussed. At the conference with the Officials of the Company the Board strongly recommended the reinstatement of the strikers in their employment pending further action of the Board.

At the time appointed the Board were waited upon by several of the leaders of the strikers and a delegation of the men, when a statement in writing of their grievances were lodged with the Board.

After considerable discussion the men consented to go back to work and submit their complaint, as filed, to the final award and determination of the Board, they agreeing to be bound by any award which the Board might make. At a subsequent meeting between the Board and the Officials of the Company, the statement of the men's grievances were communicated to them, together with the men's offer of arbitration and final award. The Officers of the Company declined to arbitrate or re-instate the men in their employment.

Upon the determination of the Company not to arbitrate, being subsequently communicated to the men; after considerable discussion between themselves, the men requested an investigation of their grievances under section 59 of the Ontario Railway and Municipal Board Act, 1906.

The Board then gave the men an appointment for an investigation to be held at the Court House in the City of London, on Wednesday the 1st of August at 2 o'clock in the afternoon, and directed that a copy of the statement of the men's grievances, together with the appointment, should be served upon the Company. The Board again strongly urged the men to return to their employment, which a large number of them did. The complaints hereinafter set out in detail were the grievances lodged with the Board by the employees of the Street Railway Company.

After having made every effort to effect a settlement between the Company and the men by conciliatory means, and such effort having failed; pursuant to their appointment the Board held a session at the Court House in the City of London on the 1st and 2nd days of August, 1906, for the purpose of investigating all the facts bearing upon the strike, and for the purpose of making such recommendations to the parties concerned, as would contribute to a fair and equitable settlement of the differences which caused the strike.

E. T. Essery, Esq., Barrister of London, appeared on behalf of the men.

Mr. Isadore Hellmuth, K. C., and J. O. Dromgole, Esq., Barrister, appeared on behalf of the Street Railway Company.

The following witnesses were called and examined under oath on the behalf of the men:—

William Smith Atcheson, George B. Angles, Alfred Leslie Sparling, Thomas Albert Ferguson, Hugh W. Buchannan, George Blaker, John Holmes, John Tuke, Wilmot A. Pickle, Charles Stuart, Arthur G. Warner, Sanford Abrey, Frederick B. Zimmerman, James H. Potts, Herbert Hollingshead, John W. Sutton, Henry Vincent Kay, Henry Hall, Peter Stenburgh, Arthur Baker and George H. Bentson, Peter W. D. Broderick, Robert Egerton and W. T. T. Williams were examined under oath on the behalf of the Street Railway Company. The taking of evidence and addresses of Counsel took nearly two days.

After hearing the evidence and addresses of counsel the Board found as a fact, that in consequence of the strike, the general public had suffered and were likely to suffer inconvenience by reason of the means of transpor-

tation not being supplied by the Company. It was established by the evidence that about eighty of the employees of the Street Railway were out on strike at 2 a.m. on the morning of Friday the 27th day of July, and from that time until the majority of the men returned to their work the street car service was irregular.

At the close of argument of Counsel, the Chairman, Vice-Chairman and Mr. Kittson delivered the opinions, copies of which are transmitted herewith.

As a result of the investigation of the complaints submitted by the employees of the London Street Railway, hereinafter set forth, the Board reports the following formal findings and recommendations:—

1. "The Company shall pay for uniforms of the conductors and motormen who have been in their service over 6 months."

The Board found that this would be impracticable and declined to recommend the Company to provide uniforms for their Conductors and Motormen.

2. "The Company shall supply conductors with \$20.00 cash to enable them to run their cars without having to use their own personal funds."

The Board recommend that the Company should supply their conductors with \$20.00 cash to enable them to make change, upon the conductors giving a bond to the satisfaction of the Company as security for the money advanced for this purpose.

3. "Regular or day men will not be required to take their fare box into the office at noon, relief time, but may leave it in care of the relief conductor."

The Board find that this complaint is well founded and that it is a hardship to the men, and recommends that the Company shall at once adopt such measures as will remedy this grievance.

4. "Regular or day men to be required to clean car or windows before leaving car sheds."

That as the men have to furnish their own uniforms, and are required by the Company to appear in decent attire, and as cleaning the cars and windows soils and destroys their uniforms, the Board recommends that in future conductors or motormen, employed on the cars, shall not be required to do such work.

5. "Regular men will not be required to give up their regular runs for any special runs."

The Board found, on the evidence, that regular men have only been required to make special runs under very exceptional circumstances and for greater safety, particularly on occasions where large numbers of small children have to be carried. The Board recommends a continuance of this practice, but beyond this recommends that regular men shall not be required to give up their regular runs for special runs.

6. "That conductors shall not be required to perform the duties of a motorman, nor a motorman perform the duties of conductors."

The Board found upon the evidence, that this practice has not been indulged in to any very great extent. The Board recommends that only in the case of emergency should a conductor be employed to do the duties of a motorman, or a motorman the duties of a conductor.

7. "That in future, the working hours of regular men shall be as near as possible nine hours a day."

In the absence of evidence, the Board are not in a position to recommend any change in the working hours of the men.

8. "That in future, the pay shall be 20c. per hour for Conductors and Motormen."

In the absence of evidence the Board are not in a position to recommend an increase in the present schedule of wages for conductors and motormen.

9. "Reinstatement of three discharged men, namely:—Chas. Stuart, motorman; Wm. Atcheson, conductor; H. B. Buchanan, conductor."

The majority of the Board, on the evidence, declined to recommend the reinstatement of the said three discharged men.

10. "Duly authorized Committee of the Union to treat with the Company in matters of grievances which may arise from time to time."

There being no law to compel the Company to treat with a Committee of the Union, as such, the Board do not make any recommendation in the matter.

11. "That the Company will not discriminate against any employee because of his membership in the Union and shall not put anything in the way of any employee from joining any Labor Union."

Upon this matter being mentioned at the investigation, the counsel for the Company, without any hesitation stated that the Company would not discriminate against employees joining the Union, and would not put anything in the way of any employee from joining any Labor Union. The Board recommend the Company to carry out, as no doubt they will, the undertaking of their counsel in reference to this matter.

Dated at the office of the Ontario Railway and Municipal Board, Toronto, 3rd of August, 1906.

(Sgd.) JAMES LEITCH,

The Chairman of the Railway and Municipal Board.

To the Hon. J. J. Fox, Attorney-General, Toronto.

THE ONTARIO RAILWAY AND MUNICIPAL BOARD.

In the matter of the complaint of the employees of the London Street Railway.

OPINION OF THE BOARD.

The Chairman:—After consulting with my brethern of the Board we are of the opinion that we can dispose of this matter at once, without reserving judgment, and that we can outline to the gentlemen of the Bar concerned in the matter the substance of our report to the Attorney-General.

It is fairly clear to the Board, that the real difficulty, which caused this strike, was the discharge of the three men, Stuart, Atcheson and Buchanan. It is clear to our minds that this was the determining factor in bringing about the strike, and that the other matters which have been brought before the Board were in the nature of after thoughts, which were perfectly proper to bring before the Board. Because they were after thoughts is no reason why they should not be disposed of by this Board.

I want, as carefully as I can to state what the attitude of the Board is towards the men and the Company. Both have their rights, which must be respected. The men have a perfect right to combine and form a Union. There is no law against it. In very many cases I have no doubt the work of the Union is good, and that it will tend to the assistance of the men. While enabling them to discuss their rights and their privileges, and pos-

sibly any injustice that they may be suffering from; the combined action of a Union may likewise help to redress their grievances. I do not think that the Company have any very great cause of alarm, by the formation of this Union. I have no doubt that they look upon the Union as a sort of Bete Noir, and all that, but probably not with any very great reason. However, it was a very natural thing for the Manager of the Company to take a strong stand against the Union; one would naturally expect that. I do not mean to say that he was judicious in his remarks in reference to the Union; it would have been better had he said nothing at all about what might happen (if he did say so) in reference to the men who were about to join the Union, and who thought proper to do so. One always resents a threat, and it would be very much better that threats should not be made in reference to these matters. The Manager unquestionably did take strong ground against the Union. He had a right to do so. He had no right, however, to attempt to terrorize the men. That will not be tolerated in this country. While men have a perfect right to form a Union, it certainly should not give them any greater rights than men who do not see fit to join a Union. The fact of their having joined a Union should be no excuse for careless or improper conduct of any kind. While in the employment of the Company, the fact that a man is a member of a Union should not for one moment deter the Company from dismissing him if he is drunken or incompetent or negligent or careless or inattentive to his duties. The Company have a public duty to perform. They are engaged in hazardous business. They are carrying the public and are responsible, to a great extent, for the lives and limbs of the people who ride on their cars. They cannot properly carry on their business unless they have men who are careful and skillful in their work.

Now it appears to the Board that these are the relative positions of the men and of the Company. It is desirable that they should live in peace and harmony, and pull together as far as possible. Capital cannot be divorced from labor. They are married, they must live together.

In reference to the three men that were discharged. The application to us in terms, asks that they be reinstated. On the evidence before us, we certainly cannot recommend the reinstatement of these men. It would be a very serious thing indeed, if the Board lightly interfered with the right and discretion which every employer of labor must have in discharging or retaining the men in his employment. One can readily conceive a case where an employer might be justified in discharging a man for less cause than these men were discharged for. There might be such incompatibility of temper as would render it necessary for an employer to discharge a most excellent man in every other respect. Of course one recoils from the idea of discharging a man without just cause; one has a natural sympathy for the employee. This Board will not, however, try cases on sympathy. We must try them on well understood principles of law, and upon the evidence, and when we depart from that rule of conduct we are sure to go wrong. We have a natural sympathy for the three discharged men, and we would feel very strongly and make a very strong recommendation, if we found they were discharged without good cause and simply because they had joined the Union. Notwithstanding the strong feeling we entertain, we cannot find, upon this evidence, that the Company were wrong in discharging these men, or that they discharged them simply because they joined the Union. The Board, on the facts given in evidence cannot recommend the reinstatement of these men. No good purpose would be served by lecturing the men on their duty to the Company, or the Company on their duty to the men. They are sensible people and understand these matters. I may be per-

mitted to say, however, that due care should be taken by the Company to see that they have good cause for discharging a man, but when a good cause does exist there is no reason why they should not act. It is their duty to dismiss, because they owe a duty to the public. That disposes of that question.

The men ask that an authorized committee of the Union should treat with the Company. There is no law compelling the Company to treat with the Union. That is a matter that will have to go on as it has done heretofore. Let them treat with them or not as they see fit, just as the men can form a Union if they see fit.

As to number II, the Company take the ground that I would expect reasonable and sensible men to take; that is, that they will not discriminate against any employee because he becomes a member of the Union or because he has gone out on strike. The officers of the Company, if they are sensible men, would not take any other course than the one which their counsel say they are prepared to take. A man has perfect liberty to join a Union if he sees fit to do so. That should not stand against him as a black mark. The fact of the men going out on a sympathetic strike, (and that is what these men seem to have done) is not going to stand against them, but what will stand against these men is carelessness, negligence and inattention to duty.

In reference to shortening the hours of labor and increasing the pay of the men in the employment of any Company, the policy of the Board better be understood at the outset. These matters involve very serious considerations. It is a very extraordinary thing to ask anybody to dictate to capitalists what hours their men should work or what pay they should give. If a man is not satisfied with his pay, it is a free country and he can quit. However, there might be occasions where it would work serious inconvenience to the public, and if the Company did not pay their men a fair wage, but in order to enable the Board to decide so important a question as the length of hours the men should work, or the pay they should receive, a very careful investigation would have to be made, not only into the affairs of the Company but also into local conditions. Capital will not be invested unless the investment will be remunerative. The man who invests his money wants some return for it, and he is as much entitled to some return as the man who does the work. We would have to ascertain how many miles of road are in operation, the bonded indebtedness, the Company's fixed charges, the Company's earnings, their working expenses, the condition of the road, and the local conditions under which the men work; because men working in a small place, and I am not saying London is a small place, it is a very beautiful city, but men working in a small place would hardly expect the same wages as men working in a place where the population is congested, and where they would be rushed every hour of the day in the performance of their duties. It is a very different thing working on a street car in a city like Chicago or Montreal or in London or Hamilton, to what it is in a small town, where the population is not congested and where there is comparatively few people to carry. All the local conditions would have to be gone into carefully and a most searching investigation would have to be made, before the Board would feel justified in making a recommendation either to shorten the hours of labor or increase the pay of the men. We do not think any case has been made which would justify us in making a recommendation of that kind. I do not think it was the intention of counsel for the men to go into that question exhaustively, because he, as well as ourselves, has a just appreciation of the case that should be made to enable us to make a recommendation of that kind.

Then as to number 6. It has been said by the counsel for the Company that it is not desirable for conductors to be called upon to perform the duties of motormen as a general thing. We accept his undertaking that that will not be done, except to the extent that it is desirable that the conductors should know something of the duties of a motorman in case of emergency or an accident. I do not think that the men and the Company are very far apart on that subject.

They certainly are not very far apart as to Number 5. That regular men should not be required to give up their runs for special runs. I do not think that it would be desirable that the regular men, as a general thing, should make these special runs. Let the special men do that. But in cases of necessity, where great care should be exercised, as, where children are being carried to Springbank, the very best men in the Company's employ should be assigned to these runs.

As to number 4, we are of the opinion that what the men ask is perfectly reasonable and that they should not be required to clean cars before leaving the barns, unless they are paid for doing so, and we shall make a recommendation to that effect.

Number 3 is practically conceded by the Company and we will make recommendation that some arrangement be made for the convenience of the men in exchanging their fare boxes.

As to Number 2, we recommend that this amount of cash be given to the men in order to make change, upon their doing, just as other people do, who are entrusted with cash, putting up a bond, as security for the advance, which will cost them very little.

So far as the uniforms are concerned, the Board will not make any recommendation in favor of the Company providing uniforms for the men. The difficulty in doing that seems to me to be insuperable.

Mr. Essery suggested that the uniforms should be given up when the men leave the employ of the Company. They are under no obligation to remain in the service of the Company for any length of time. So far as I know a man can leave on very short notice. He might quit a few days after he got his uniform. Nobody cares to wear cast-off clothing. I would not ask a man to do it. I would not do it myself. Therefore it seems to me impracticable to provide uniforms for the men. I think this will have to be left as it is, and when a man leaves the employment of the Company he can cut off the buttons and turn his uniform into an ordinary suit.

This, I think, covers the whole case as it is before us. We regret exceedingly that the difficulty has arisen. All we can do is to urge upon the officials of the Company to be fair and just and to use as much tact and judgment as they possess in getting along with the men. We strongly advise the men to join with the Company in doing the best they can in the public interest. The Company owe the public a duty and they cannot perform that duty unless the men join with them and give an honest day's work for a fair day's pay, using every care and diligence and all the skill that they possess, in the performance of their duty.

Another matter which my brother Kittson has suggested to me, is, as to the action of the men in going out on strike when they knew the Board had been summoned by the Mayor, Mr. Judd. It seems to me the Mayor of the city acted with a great deal of judgment and with a single eye to the public interest when he took advantage of the section of the Act and notified the Board that a strike was imminent. The city had an unfortunate

experience a few years ago, in a strike upon this same railway, where actual violence was committed, and great loss was suffered by both the men and the Company. The Board thought that the men might have waited until they arrived before actually going out on strike. However, that is a matter of policy for which the leaders of the strike are responsible and I am not going to inveigh against the men on that subject.

Men engaged in a strike want to make it successful. Probably they thought that if they did not actually go out on strike the Company would say there is no strike and nothing to investigate. I think it would be well in the future to notify the Board and await their coming and mediation before so dangerous a movement is made. First mediate and then, if an agreement cannot be reached, when nothing else is open the strike should be the last resort. Strikes are not to be commended, neither is war, but sometimes the sword must be drawn.

We have to thank the legal gentlemen who have appeared before us for their courtesy to the Board. It was a pleasure to listen to this case; it was certainly well presented on both sides, but I hope, much as I like the City of London, that it will be a long time before we are called upon to perform a similar duty here.

The VICE-CHAIRMAN: I fully concur in all that the Chairman has said, in connection with the case brought before us, with the exception of his remarks concerning the dismissal of Mr. Stuart, Mr. Atcheson and Mr. Buchannan.

Mr. Stuart appears to be an intelligent man and had given intelligent evidence, but in my judgment he deserved dismissal, and I would even go further and say that the management should be reprimanded for not having dismissed him at an earlier date.

I think the conduct of the management with respect to Mr. Atcheson and Mr. Buchannan was harsh, to say the least, and that the charges preferred against them are not sufficient to warrant the treatment they received at the hands of the Company. I think the explanations given by Mr. Buchannan are reasonable. He was not an old employee, and it is quite easy for a young employee to make a mistake in registering up fares, especially if the car is over-crowded. According to the evidence he asked the motorman a question in respect to the time the car should arrive at a certain corner. It is not an uncommon thing in other cities for the conductor to ask the motorman questions, and in my experience I know of no serious accident occurring by reason of a judicious question being asked at the proper time.

As far as carrying three passengers to Springbank is concerned: that might occur in a crowded car. The witness stated in his evidence that he was not aware of it. If these are the only charges upon which he was dismissed, it seems to me rather harsh treatment.

With respect to Mr. Atcheson, I really think that the management discriminated against Mr. Atcheson by reason of his association with men who were about to become union men.

That is my judgment in this matter, and it is in these particulars that I dissent from the Chairman in his conclusions on this question.

Mr. KITTSON: I unreservedly concur in all that the Chairman has said.

THE ONTARIO RAILWAY AND MUNICIPAL BOARD.

Before A. B. INGRAM, Esq., Vice-Chairman. H. N. KITTSON, Esq., Member.	}	Wednesday, the 15th day of August, A.D. 1906.
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In the matter of the application of the Town of Oshawa for the approval and confirmation of By-law No. 638 of said Corporation, to authorize the issue of Debentures to the amount of \$20,000 for extension of Water Works.

Upon the application of Mr. C. A. Jones, Counsel for the Corporation of the Town of Oshawa for an Order approving and confirming By-law No. 638 of said corporation, entitled

"By-law No. 638, of the Corporation of the Town of Oshawa, to authorize the issue of Debentures to the amount of \$20,000, for extension of Water Works," passed by the Council of said Corporation on the 13th day of August, A.D. 1906.

Upon reading the said by-law and the declarations of Frederick Luther Fowke, mayor of said town; Thomas Morris and Luther C. Hall, clerk and treasurer thereof respectively, and of William S. Bowden, Superintendent of Water Works in said town; and upon hearing the *viva voce* evidence adduced, and what was alleged by counsel aforesaid, no one appearing to oppose the application—and it having been shewn to the satisfaction of the Board that the extensions and improvements made and to be made, as recited and set out in said by-law, were and are necessary, and that a sufficient additional revenue will be derived therefrom to meet the annual special rate required to pay the said debt of \$20,000, and interest,—and that on the final passage of the by-law three-fourths of all the members of the council of said corporation voted in favour of the by-law.

It is ordered that the said By-law No. 638, of the Corporation of the Town of Oshawa, be, and the same is hereby approved and confirmed.

(Sgd.) A. B. INGRAM,
 Vice-Chairman of the Ontario Railway and Municipal Board.

THE ONTARIO RAILWAY AND MUNICIPAL BOARD.

MEETING AT TORONTO.

Before JAMES LEITCH, K.C., Chairman; A. B. INGRAM, and H. N. KITTSON, Commissioners.	}	Friday, the 17th day of August, A.D. 1906.
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In the matter of the application of the Corporation of the Township of McKillop, for the approval and confirmation of its By-law Number 65 for 1906 to appropriate \$3,582.00 of its Municipal Loan Fund towards payment of cost of bridges.

Upon the application of the Corporation of the Township of McKillop for an Order approving and confirming By-law Number 65, for 1906, of the said Township of McKillop, passed on the 28th day of July, appropriating \$3,582.00, being a portion of the moneys standing at the credit of the Municipal Loan Fund account of the said corporation towards the payment of bridges to be built and constructed within the bounds of the said corporation, upon hearing read the affidavit of George K. Holland, treasurer of the said corporation, and the exhibit therein referred to, and upon hearing what was alleged by counsel for the said corporation, no one appearing to oppose the said application, and it having been shewn to the satisfaction of the said Board that it is expedient that the said bridges should be built by the said corporation and that the said moneys should be appropriated towards the payment of the cost of the same and that on the final passing of the said by-law the members of the council of the said corporation voted unanimously in favour of the same.

It is ordered that the said By-law Number 65, for 1906, of the said Township of McKillop be and the same is hereby approved and confirmed.

(Sgd.) A. B. INGRAM,
Vice-Chairman of the Ontario Railway and Municipal Board.

THE ONTARIO RAILWAY AND MUNICIPAL BOARD.

Before

JAMES LEITCH, Esq., K.C.,
Chairman;
A. B. INGRAM, Esq.,
Vice-Chairman;
H. N. KITTSON, Esq.,
Member.

Wednesday, the 29th day of August,
A.D., 1906.

In the matter of the application of the Municipal Corporation of the Town of Owen Sound for the approval of the investment of certain sinking funds.

Upon the petition of the Municipal Corporation of the Town of Owen Sound;

Upon reading the said petition, the affidavits of John W. Frost and Chas. Gordon, the By-laws Numbers 1031, 1032, 1110, 1177 and the By-law of the said corporation Number 1188, providing for the investment of \$6,309.92 of the sinking funds of the Corporation of the Town of Owen Sound in the purchase of debentures issued under By-laws Numbers 1031, 1110 and 1177 of the said corporation;

It is ordered, pursuant to the provisions of Sec. 420 of the "Consolidated Municipal Act, 1903," and of Sec. 53 of the "Ontario Railway and Municipal Board Act, 1906," that the said By-law Number 1188, of the Municipal Corporation of the Town of Owen Sound, providing for the investment of \$6,309.92 of the sinking funds of the said municipality in the purchase of debentures issued by said municipality under said By-laws Numbers 1031, 1110 and 1177, be and the same is hereby approved.

The said sum of six thousand three hundred and nine dollars and ninety-two cents to be invested in the debentures of the said respective by-laws as follows :

- (a) In debentures issued under By-law No. 1031 to the extent of...\$4,000.00
- (b) In debentures issued under By-law No. 1110 to the extent of... 2,000.00
- (c) In debentures issued under By-law No. 1177 to the extent of... 309.92

In the debentures of the said three by-laws to the extent of.....\$6,309.92

(Sgd.) JAMES LEITCH,
Chairman of the Ontario Railway and Municipal Board.

THE ONTARIO RAILWAY AND MUNICIPAL BOARD.

In the matter of the application of John Brown, for leave to bring an action against the Toronto Street Railway to recover a penalty.

This is an application made by Mr. John Brown, under sub-sec. 3 of sec. 47 of the Ontario Railway and Municipal Board Act 1906, for leave to prosecute an action against the Toronto Street Railway Company to recover a penalty of \$400.00 for each car run on Sunday by the Company on Dundas Street in the Town of Toronto Junction, contrary to sec. 193 of the Ontario Railway Act, 1906.

Sub-sec. 3 of sec. 47 provides that no prosecution shall be had, or penalty enforced against a Company or Municipal Corporation for any penalty under the Ontario Railway and Municipal Board Act or the Ontario Railway Act, or under the special Act by which a Company is incorporated without the leave of the Board being first obtained.

Sec. 193 of the Ontario Railway Act provides that no Company or Municipal Corporation shall operate a street railway or electric railway on Sunday. By the 2nd sub-sec. of sec. 193, it is enacted that Companies which have before the 1st day of April, 1897, regularly run cars on Sunday, may hereafter do so, and the said sec. shall not affect or apply to any Company which has by its charter or by any special Act, authority to run cars on Sunday, nor shall it affect the right if any of the Toronto Street Railway Company to run cars on Sunday.

The Toronto Railway Company having the right to run cars on Sunday on the 6th day of October, 1899, entered into an agreement with the Corporation of Toronto Junction, and the Toronto Suburban Street Railway Company, whereby the Toronto Railway Company agreed to operate each day for 23 years from the 1st day of September, 1898, its regular Dundas Street service along Dundas Street, between the limit of the Town of Toronto Junction, and the Western limit of Keele Street.

This agreement was ratified and confirmed by an Act of the Legislature 63 Vic., cap. 103, which came into force on the 30th April 1900. The Toronto Railway Company have ever since the passing of that Act been running their cars on Dundas Street in Toronto Junction on Sunday, and have fulfilled that part of their agreement with the town corporation. The applicant, John Brown, alleges that by so running these on Sunday on Dundas Street in Toronto Junction, the Toronto Railway Company have incurred the penalty provided by sec. 193 of the Ontario Railway Act, 1906, and he asks the leave of the Board to prosecute his action which was com-

menced in the month of July last to recover the penalty from the Company. When the application was first made on the 30th August last, the Board acting in accordance with the practice adopted by the late Sir Oliver Mowat when Attorney-General, adjourned the application until the 4th inst. and directed that notice of the application should be served on the Toronto Railway Company, and the Corporation of Toronto Junction, in order that all parties interested might be heard. On the 25th August the Corporation of Toronto Junction filed an application with the Board in which Mr. Brown and the Toronto Street Railway were named as respondents asking, that Mr. Brown's application for leave should not be granted, and for a declaration of the rights of the corporation to have cars run on Sunday. This application was made by Mr. Anderson, the Solicitor for Toronto Junction in pursuance of a resolution of the town council passed on the 7th August last, instructing him to take such action or proceedings as might be necessary to force the Toronto Street Railway to provide a Sunday car service on Dundas Street in accordance with the agreement of the 6th October, 1899. The Toronto Junction Council also passed a resolution on the 31st August last, declaring that it was in the interest of and for the convenience of the people of Toronto Junction that the Toronto Street Railway Company should operate their cars on Dundas Street on Sunday, and disapproving of Mr. Brown's action in the matter. An affidavit of Mr. Jesse C. Smith, the Mayor of the Town, was filed with the Board, and a copy served on Mr. Brown, verifying the facts and alleging that the want of Sunday cars in Toronto Junction was a great inconvenience and discomfort to the citizens of Toronto Junction and the City of Toronto, and that Mr. Brown's action was generally disapproved by the citizens.

On the return of the application, Mr. Kilmer appeared for Mr. Brown and argued very strongly that the Toronto Railway Company had no right to run cars on Sunday outside of the city, and that they came within the vice of sec. 193, and that the exceptions contained in sub-sec. 2 did not protect them. Mr. Anderson appeared for Toronto Junction, and Mr. Laidlaw, K.C., for Toronto Street Railway. The Council for the Company and Toronto Junction urged that the Company having generally the right to run cars on Sunday, the said agreement and the legislation confirming it gives them absolute authority to operate their cars on Dundas Street in Toronto Junction on Sunday, and that in any event they come within the exceptions contained in sub-sec. 2 of sec. 193, and are not liable to the penalties sought to be recovered against them.

The Board do not consider it necessary on the application to determine the absolute right of the Company to operate Sunday cars in Toronto Junction, and purposely refrain from doing so lest the question should be specially and specifically brought before them for adjudication. It is enough on this application to determine, and it is perfectly clear, that the Toronto Street Railway were operating their cars on Dundas Street in Toronto Junction on Sunday under color of right. They had been doing so ever since 1900, by virtue of the above mentioned agreement and legislation without hindrance, and without their right being questioned. There has been no deliberate defiant breach of the Sunday law as contained in sec. 193, no public or private interest has been assailed, no mischief has been wrought to the public or the public morals. What has been done has been a comfort and convenience to the vast majority of the citizens, and the mayor and corporation of the town now representing the citizens, and their interests ask that leave to recover the penalties sued for by Mr. Brown be not granted, and that the Sunday car service, which Mr. Brown himself says he does not want to stop,

should be continued. The Board under the circumstances are of opinion that no public interest would be served by granting Mr. Brown leave to recover penalties said to amount to \$40,000 from the Toronto Railway Company, and refuse the leave asked for accordingly. The Board makes no order as to costs. The Board have less hesitation in refusing leave by reason of sec. 254 of the Railway Act which empowers the Attorney-General without requiring the leave of the Board if he sees fit to do so, to recover all penalties under the Act for the use of the Province.

Board Room, 7th September, 1906.

(Sgd). JAMES LEITCH,
Chairman.

(Sgd). A. B. INGRAM,
Vice-Chairman.

THE ONTARIO RAILWAY AND MUNICIPAL BOARD.

Before —

JAMES LEITCH, Esq., K.C.,
Chairman.

A. B. INGRAM, Esq.,
Vice-Chairman.

H. N. KITTSON, Esq.,
Member.

Saturday the eighth day of September,
A.D. 1906.

In the matter of the application of the Municipal Corporation of the City of St. Thomas in the County of Elgin, for the approval and confirmation of by-law No. 1618 of said corporation to authorize the issue of debentures to the amount of \$16,000 for extension of Gas and Electric Light Works.

Upon the application of the above named applicant, and upon reading the affidavits of Calvin Lawrence, Mayor, W. B. Doherty, City Clerk, and George L. Oill, Manager of the Light, Heat and Power Department of the corporation of the City of St. Thomas, the applicant, filed on this application, and upon hearing what was alleged by counsel for the applicant.

This Board doth order that by-law No. 1618 of the City of St. Thomas, entitled "By-law No. 1618, to authorize the issue of debentures to the amount of \$16,000 for making certain extensions and improvements in the Gas and Electric Light Works, and Plant of the City of St. Thomas," be and the same is hereby approved of and confirmed.

THE ONTARIO RAILWAY AND MUNICIPAL BOARD.

Before :—

JAMES LEITCH, Esq., K.C.,
Chairman.

A. B. INGRAM, Esq.,
Vice-Chairman, and

H. N. KITTSON, Esq.,
Member.

Tuesday, the 11th day of September,
A.D. 1906.

In the matter of the application of the municipal corporation of the Town of North Toronto in the County of York, for the approval and confirmation of by-law No. 793 of said corporation to authorize the issue of debentures to the amount of \$7,200 for the extension and improvement of the water works system of said town.

Upon the application of the above named corporation, and upon reading the said by-law, the affidavits of Thomas Alex. Gibson, Barrister and

Solicitor for said corporation, William John Lawrence, member of the council of said town and chairman for the present year of its water, fire and light committee, and of John Fisher, Mayor of said town, filed on this application, and upon hearing what was alleged by counsel for the applicant.

This Board doth order that by-law No. 793 of the Town of North Toronto, entitled "By-law No. 793, a by-law to provide for the improvement of the system of water works of the Town of North Toronto by the construction of a steel reservoir, and to provide for the issue of debentures to the amount of \$7,200 for payment of the cost thereof and incidental thereto," be and the same is hereby approved of and confirmed.

(Sgd.) JAMES LEITCH,

Chairman of the Ontario Railway and Municipal Board.

THE ONTARIO RAILWAY AND MUNICIPAL BOARD.

Before:—

JAS. LEITCH, Esq., K.C.,

Chairman.

A. B. INGRAM, Esq.,

Vice-Chairman, and

H. N. KITTSO, Esq.,

Member.

Tuesday, the 11th day of September,
A.D. 1906.

In the matter of the application of the Toronto and York Radial Railway Company, for the approval under sect. 221 of the Ontario Railway Act, 1906, of Alexander M. Smith, of the City of Toronto, Mechanical Superintendent of said railway, as an examiner of motormen under said section of said Act,

Upon the application of the Toronto and York Radial Railway Company, and upon hearing what was alleged by the applicants, and upon examining the said Alexander M. Smith.

This Board doth order that the appointment of the said Alexander M. Smith, of the City of Toronto, in the County of York, Mechanical Superintendent of the Toronto and York Radial Railway Company, as an examiner of motormen for the said railway company, be and the same is hereby approved by the Board, under and in pursuance of section 221 of the Ontario Railway Act 1906.

JAMES LEITCH,

Chairman of the Ontario Railway and Municipal Board.

THE ONTARIO RAILWAY AND MUNICIPAL BOARD.

Before:—

JAMES LEITCH, K.C.,

Chairman.

A. B. INGRAM, Esq.,

Vice-Chairman, and

H. N. KITTSO, Esq.,

Member.

Tuesday, the 18th day of September,
A.D. 1906.

In the matter of the application of the Toronto and York Radial Railway Company, for the approval by the said Board of the Fender-Pilots used on suburban cars of the said railway company.

Upon the application of said railway Company, and upon reading the report, dated September 13, 1906, made by R. Sherwood Elmslev, Civil

Engineer, appointed by the said Board to inspect the said fender-pilots, upon considering the plans of said fender-pilots filed by the said Company, and upon hearing what was alleged by the applicants.

It is ordered that the fender-pilots intended to be used on the suburban cars of the said Railway Company, in accordance with the said plans filed, be and the same are hereby approved, provided, however, that the approval of such fender-pilots may be withdrawn by this Board, if, at any time, the traffic on any portion or portions of the line or lines of said railway Company, shall, in the opinion of the Board, call for or require the use of a different or other fender-pilot or fender.

(Sgd.) JAS. LEITCH,

Chairman of the Ontario Railway and Municipal Board.

THE ONTARIO RAILWAY AND MUNICIPAL BOARD.

Before

JAMES LEITCH, Esq., K.C.,
Chairman;
A. B. INGRAM, Esq.,
Vice-Chairman, and
H. N. KITTSOX, Esq.,
Member.

Friday, the 21st day of September,
A.D. 1906.

In the matter of the Application of the Municipal Corporation of the Town of Mount Forest, in the County of Wellington, for the approval of the by-law of the said corporation to authorize the issue of debentures to the amount of \$5,000.00 for the extension of the Water Works System of said town.

Upon the application of the above named corporation, and upon reading the written application, dated the 15th day of September, A.D. 1906, signed by the mayor, clerk and treasurer of said town, and certified by the affidavits of said mayor, clerk and treasurer, the written statement dated the 17th day of September, 1906, signed by John A. Hunter, Town Engineer for Mount Forest aforesaid, and certified by the affidavit of the said John A. Hunter, and upon reading a certified copy of the said by-law:

This Board doth order that the said by-law of the said Town of Mount Forest, entitled "A By-law to raise by way of loan the sum of \$5,000.00 to extend, improve and complete the Water Works System in the said Town of Mount Forest, and to authorize the issue of debentures," be and the same is hereby approved of and confirmed.

(Sgd.) JAMES LEITCH,

Chairman, Ontario Railway and Municipal Board.

THE ONTARIO RAILWAY AND MUNICIPAL BOARD.

Before

JAMES LEITCH, Esq., K.C.,
Chairman;
A. B. INGRAM, Esq.,
Vice-Chairman, and
H. N. KITTSOX, Esq.,
Member.

Friday, the 21st day of September,
A.D., 1906.

In the matter of the application of the Toronto Railway Company for the approval, under Section 221 of the Ontario Railway Act, 1906, of Wil-

liam Henry Nix, of the City of Toronto, Chief Roadmaster of said Company, as an Examiner of Motormen under said section of said Act.

Upon the application of the Toronto Railway Company and upon hearing what was alleged by the applicants and upon examining the said William Henry Nix;

This Board doth Order that the appointment of the said William Henry Nix, of the City of Toronto, in the County of York, Chief Roadmaster of the Toronto Railway Company, as an Examiner of Motormen for the said Company, be and the same is hereby approved, under and in pursuance of Section 221 of the Ontario Railway Act, 1906.

(Sgd.) JAMES LEITCH,
Chairman of the Ontario Railway and Municipal Board.

THE ONTARIO RAILWAY AND MUNICIPAL BOARD.

Before

JAMES LEITCH, Esq., K.C.,
Chairman;
A. B. INGRAM, Esq.,
Vice-Chairman, and
H. N. KITTSON, Esq.,
Member.

Friday, the 21st day of September,
A.D., 1906.

In the matter of the application of the Toronto Railway Company for the approval, under Section 221 of the Ontario Railway Act, 1906, of Thomas Hogg, of the City of Toronto, Superintendent of Employment of said Company, as an Examiner of Motormen under said section of said Act.

Upon the application of the Toronto Railway Company and upon hearing what was alleged by the applicants and upon examining the said Thomas Hogg;

This Board doth order that the appointment of the said Thomas Hogg, of the City of Toronto, in the County of York, Superintendent of Employment of the Toronto Railway Company, as an Examiner of Motormen for the said Company, be and the same is hereby approved, under and in pursuance of Section 221 of the Ontario Railway Act, 1906.

(Sgd.) JAMES LEITCH,
Chairman of the Ontario Railway and Municipal Board.

THE ONTARIO RAILWAY AND MUNICIPAL BOARD.

Between the Corporation of the Town of Napanee, Applicants, and the Napanee Water & Electric Light Company, Limited, Respondent.

It is agreed between the parties hereto that these proceedings be withdrawn upon the following terms and conditions:—

1. The respondents are to remove forthwith all loose or dangerous wires now connected with their system of electric light in the Town of Napanee.

or to adopt such other means or appliances as may be necessary or expedient for the safety of life and property in caring for loose or dangerous wires.

2. It is further agreed between the parties hereto that in case any other wires belonging to the respondents should hereafter become loose or dangerous, the applicants shall be at liberty to cut and remove the same, doing as little damage as practicable to the property of the respondents, but in no case shall its wires be cut or removed without first notifying the respondent's manager and locating the dangerous wire or wires complained of.

3. Each party hereto is to pay its own costs.

Dated this 24th day of September, A.D. 1906.

(Sgd.) W. S. HERRINGTON,

Solicitor for Applicants.

(Sgd.) ALF. KNIGHT,

Manager for Respondents.

THE ONTARIO RAILWAY AND MUNICIPAL BOARD.

Before

JAMES LEITCH, Esq., K.C.,

Chairman;

A. B. INGRAM, Esq.,

Vice-Chairman, and

H. N. KITTSOX, Esq.,

Member.

Tuesday, the 27th day of September,
A.D. 1906.

In the matter of the approval by the Board, under Section 209 of the Ontario Railway Act, 1906, of fenders, brakes, and other life-saving appliances for use of railways being subject to the said legislation, and in the matter of the examination and testing of the same for such approval.

ORDER APPOINTING ENGINEER.

The Board hereby appoints and directs John F. H. Wyse, of the City of Toronto, in the County of York, Electrical Engineer, to carry on and conduct proper and sufficient tests of all such fenders, brakes and other life-saving appliances, mentioned in Section 209 of the Ontario Railway Act, 1906, as shall be submitted to him, the said John F. H. Wyse, for the approval of the Board.

(Sgd.) JAMES LEITCH,

Chairman of the Ontario Railway and Municipal Board.

THE ONTARIO RAILWAY AND MUNICIPAL BOARD.

Report of the Ontario Railway and Municipal Board on railways in Ontario, the control of which has been brought under the jurisdiction of the Dominion of Canada and subsidies thereto.

About — charters have been obtained from the Province of Ontario by railway companies since Confederation. Of these a large number have, properly enough, come under Dominion control, by amalgamation with the Grand Trunk and Canadian Pacific and other lines operating under Dominion

charters and by being leased and operated by these railway companies. No complaint can be made by reason of the above lines of railway being brought under the jurisdiction of the Dominion authorities. Besides these, however, several lines of railway have come under Dominion control by being declared by the Parliament of Canada to be works for the general advantage of Canada. Many of these are comparatively short lines of railway, entirely within the limits of the Province of Ontario and are merely of local concern.

The assumption of control by the Dominion Parliament over these lines of railway is not now justified by any question of public policy. No doubt at the time that the legislation was procured from the Parliament of Canada, declaring these lines to be for the general advantage of Canada, and in that way putting them under Dominion Control, it was urged that there was no legislation provided by the Legislature of the Province for the regulation and control of railways. That reason no longer prevails. Besides the above mentioned steam railways there are several electric street and radial railways, which in recent years have been brought under the control of the Dominion. These electric railways run along streets and public highways, subject to agreements with the municipalities.

The Dominion Railway Act and the amendments thereto would appear to apply only to the case of steam railways and provides no machinery for the regulation or control of electric railways. It is questionable that the Parliament of Canada has any jurisdiction over the municipalities through which these electric railways run. The anomaly therefore exists of railways purely local in their character, operating under agreements with the municipalities being declared to be for the general advantage of Canada and in that way put under the authority of the Board of Railway Commissioners for Canada, which has no legal machinery adapted for the enforcement of the rights of the municipalities against such railways or *vice versa*. This state of affairs can only be remedied by the Parliament of Canada repealing the portions of the Acts declaring such railways to be for the general advantage of Canada.

There is no reason why this state of affairs should exist, particularly in view of the fact that the Legislature of the Province of Ontario at its last session passed a general railway Act applicable not only to steam railways under Provincial control but also to street and other electric railways. Another Act provides for the appointment of a Railway and Municipal Board, which has jurisdiction not only over the railways but has power to compel the municipalities to carry out their agreements with these railways. The subsidies granted by the Ontario Government in aid of railways and bonuses and other aid from the municipalities up to the 30th of June, 1905, amounts to the large sum of \$27,570,617.84, and are made up as follows:

Provincial Government Bonuses	\$14,656,420.04
Municipal Bonuses	10,069,843.80
do Loans	1,632,854.00
do Subns. to Stock	1,211,500.00
	<hr/>
	\$27,570,577.84

Railway Board Room, 29th Sept., 1906.

JAMES LEITCH, Chairman.

A. B. INGRAM, Vice-Chairman.

To the Ontario Railway and Municipal Board:

The Corporation of the City of Hamilton hereby petitions your honourable Board, under the provisions of the Ontario Railway and Municipal Board Act, 1906, for an investigation into the matters and complaints hereinafter set forth against the Hamilton Street Railway Company and request your honourable Board to hear evidence in support of the petition and to fix a time for such hearing and to give such relief as to your honourable Board may seem meet.

1. The Hamilton Street Railway Company, under and by virtue of certain by-laws entered into with the City of Hamilton, own and operate a system of electric trolley cars over and upon certain streets in the said city.

2. The said cars are operated by electricity supplied from an overhead system of wires and upon a system of double tracks. Your petitioners allege that the said tracks are in a bad and worn out condition over practically the whole system; the rails are flattened and worn at the joints; the pressure of the car wheels upon the rails is uneven and the lip of the rail is in many places entirely worn off. The rail used is not a suitable rail for the wheels upon many of the cars operated upon the said system.

3. The tracks and road-bed are badly constructed and ballasted, allowing the rails to spread and causing such vibration of the rails as to render it practically impossible to maintain the adjacent pavement in proper condition.

4. The cars operated upon said rails are, in many instances, dilapidated and in very bad repair and the general up-keep of the cars is unsatisfactory, the same being poorly kept and dirty. Many of the cars are entirely unfit for service to be performed. The fastenings, bolts and loose parts of the said cars are in such condition as to cause a maximum amount of noise.

5. The working parts of the cars are badly worn and on some of the cars wheels much wider than the rail are being used, consequently damaging the pavements alongside. The system of brakes is inadequate for the service.

6. The rate of speed on Herkimer, James St. South, Locke and Barton Streets is too great. The service on York Street is a ten minute service, the Company operating two stub cars from James Street. This service is inadequate for the district to be served by the system.

Dated at Hamilton this 1st day of September, 1906.

GEORGE S. KERR.

Solicitor for the Corporation of the City of Hamilton.

THE ONTARIO RAILWAY AND MUNICIPAL BOARD.

Before

JAMES LEITCH, Esq., K.C.,
Chairman;
A. B. INGRAM, Esq.,
Vice-Chairman, and
H. N. KITTSON, Esq.,
Member.

Friday, the Seventh day of September,
A.D. 1906.

Between the Municipal Corporation of the City of Hamilton, Applicants,
and the Hamilton Street Railway Company, Respondents.

ORDER APPOINTING ENGINEER.

The applicants herein having in and by their notice of application complained of the condition and equipment of the Hamilton Street Railway;

The Board hereby appoints and directs John F. H. Wyse, of the City of Toronto, in the County of York, Electrical Engineer, and Henry W. Middlemist, of the same place, Civil Engineer, carrying on the business of engineers under the firm, name and style of Wyse & Middlemist, to make an enquiry and report upon the application, complaint or dispute pending herein before the Board, and the Board reserves the question of the costs and expenses to be incurred in making such enquiry and report, and in what proportion and by whom such costs shall be paid.

JAMES LEITCH,

Chairman of the Ontario Railway and Municipal Board.

REPORT OF THE HAMILTON STREET RAILWAY, OF HAMILTON, ONT.,
TO THE ONTARIO RAILWAY AND MUNICIPAL BOARD, TORONTO.

Toronto, Ontario, September 18th, 1906.

GENTLEMEN,—In compliance with your instructions of Aug. 21st and Sept. 7th to report to you on the condition of the Hamilton Street Railway, we beg to submit the following:

Power.

The power for the Hamilton Street Railway is supplied by water taken from Lake Erie, through the Welland Canal, to Decew Falls, a point near St. Catharines, where at about 275 feet head alternating current is generated and transmitted to Hamilton at 22,000 volts. At the Cataract Company's substation on Victoria Street alternating current is changed to direct current by means of two synchronous motor-generator sets. These motors are built and wound for 1,000 k.w. at 2,400 volts, two phase, and the generators for 750 k.w., 600 volts direct current. They are coupled in with 264 storage battery cells with a total capacity of 800 ampere hours. There is developed now at Decew Falls (the generating station) a total of 28,800 k.w., with two units of 2,000 k.w. each, and one unit of 6,400 k.w. not in use. We mention this to show that there is ample capacity for Street Railway power and lighting requirements for some time to come in Hamilton.

Sub-station.

Storage
battery.

Auxiliary
power.

At the substation on Victoria Street is located also an auxiliary plant consisting of four Sterling water tube boilers of 500 horse power each, two enclosed heaters and two Goldie & McCullough improved Wheelock cross compound non-condensing engines with a capacity of 1,500 horse power each. These engines have been worked up, the station superintendent informs us, to 2,200 horse power each. This equipment is complete with switch boards, circuit breakers, lightning arrestors, etc., etc., and in our opinion first-class and up-to-date in every respect. By use of the storage battery, the entire street railway system may be operated for eight hours after the generating plant at Decew Falls has been

entirely shut off. This, with the auxiliary steam plant available for street railway and other work, is a guarantee of continued and uninterrupted power delivered to the Street Railway Company's circuits. We may say that this station is run in multiple with the radial and Dundas power houses, which gives the regulating benefit of the storage battery to the entire Street Railway and suburban services of Hamilton.

The Overhead Work.

The overhead work seems to have been built in a substantial and workmanlike manner, and consists of ordinary span wire and bracket construction on wooden poles, the poles being inconspicuous in color. There is a little iron pole work construction, as shown on Map No. 1 herewith submitted.

It is noticeable that the private telephone line of the Street Railway Company is carried out on the span wires in places to avoid the foliage of trees with which it would come in contact if erected on the poles. For this condition see photograph No. 6. This line work, we understand, gives a minimum amount of trouble to the Street Railway and we have heard no complaint of same from the public.

Railway
Telephone
Lines.

The Track and Street Paving.

At the north-east end of Guise Street the track describes a semicircle returning to James Street in a westerly direction parallel to the track going east. From Hewson Street going east and around the loop back to Hewson Street the track is laid with T. rail. From Hewson Street west to James Street both tracks are girder grooved rail, 65 lbs. per yard.

These tracks run to James Street N. and pass into the latter street around two curves of "Special Work" (or rails especially curved in the manufacturer's shop ready for laying).

The north curve going into the west track on James Street N. is bad at the joints, which are loose, and some joints have the end of one rail lighter than the other, for instance, at the point of north curve, outer rail, on Guise Street, the end of one rail is about 3-8 inch higher than the other rail. At the joint at point of tangent (inner rail) the gauge line of one rail projects about $\frac{1}{4}$ inch inwards beyond the end of the other. *Photograph No. 1* shows the condition of high joint on outer rail on Guise Street, as above mentioned.

The outer rails on this curve are all loose at joints, and at the joint at point of curve the inner rail is pounded low.

After leaving these curves the two tracks run straight up James Street without any branches till they reach Stuart Street.

On the west track of James Street the ties are spaced three feet centres and those on the east track are spaced two feet six inches centres (see Photo No. 2) as far as Stuart Street. The street material is supposed to be McAdam.

The City were excavating at the corner of Pieton Street for sewer repairs, a leakage having occurred. This sewer is laid under the "Devil Strip," or space between the two tracks, and the per-

sons excavating for the present repairs have cut a foot off the ties as far as they have been dug out (40 or 50 feet) leaving only 6 inches of the tie past the foot of the rail on the outside of each inner rail.

Cut off tie ends.

The ends of the ties on the outer rails of both tracks so far as we could learn have not been cut off. The ties, although they have been laid down about 12 or 14 years (See Map No. 2) still seem to be in good condition, but the ground under them where they could be seen at the above excavation was not what we would consider suitable for the foundation of a good track. We could see no traces of ballast, and it is probable sand was used at the time the line was laid. See Exhibit No. 1.

We would like to point out that we consider the cutting off of the tie ends very injurious to the track, depriving the ties of sufficient bearing area at the very part it is most required, causing the inner rails of the two tracks to sink down and consequently leaving depressions for surface water and sand.

From Guise Street up to this point on James Street there are several loose joints which cause considerable noise when the cars are passing.

The tracks on James Street between Ferrie and Strachan Streets seem in fairly good order for a McAdam street, and do not appear to deflect under the passing cars.

James Street between the Company's tracks from Guise Street to Strachan Street is not in good repair. The road surface has sunk, leaving the rails high, and this would naturally be hard on the wheels of wagons and other vehicles using that portion of the street.

From Strachan Street along James Street, going south, there are loose joints, in some cases one rail end being higher than the other. These are near the Grand Trunk bridge and Stuart Street. *Photo No. 3* shows a bad joint near the bridge on the west track north of Stuart Street.

Paving

South of Stuart Street, James Street is laid with asphalt paving as far as the T. H. & B. railway station, and stops at the north side of the crossing. The straight tracks south of Stuart Street are in very fair condition, only two bad joints being found on this stretch, one half way between Murray and Barton Streets, and the other at Mulberry Street on west track.

The cross over opposite Oak Hall on James Street is in very bad condition, and the cars make considerable noise passing over; the frogs seem very badly worn. We understand, however, that the company have new crossover in stock which they intend putting in at an early date.

There are loose joints on the straight track between this crossover and the curved special work running into King Street east and west. This curve is in excellent condition and is well laid.

The ties from Stuart Street to this point are two feet centres. Continuing south along James Street, after leaving King Street, there are several bad joints opposite the merchants' Bank and near Main Street. There is a low place on the Devil Strip in front of the Spectator Building near Main Street where large cars will not pass each other. This is said to be due to the breaking of a water pipe, see Photos No. 1 A and 2 A. There is a similar place near

Jackson Street, where there are also some bad joints. The ties from King Street East to T. H. & B. are three feet centres.

At the T. H. & B. crossing all the joints are loose and four of them are high, that is one rail end is higher than the other. The T. H. & B. Company are said to be getting new crossings from England for this.

James Street south of the T. H. & B. Railway is McAdam with cedar blocking paving between the rails of the tracks and on the devil strip. This block is in a bad condition, and so is the street on the outside of the tracks.

From the beginning of James Street up to the T. H. & B. crossing the rails are 65 lbs. grooved girder rail, German section.

The joints on this part of James Street up to the curve at Herkimer are more or less loose and the rails are pounded at the ends and worn and the groove lips broken and flattened, one rail end often being higher than the other. The cars on this portion of James Street make considerable noise. *Photo No. 4* shows condition of joints at this section.

From the T. H. & B. crossing on Herkimer Street the track is laid with Johnstown rail.

The ties to Herkimer Street from T. H. & B. crossing are laid two feet centres.

The track on James Street south of Herkimer Street to the incline is in fairly good condition. Ties are laid 2 feet 6 inches centres.

The straight track along Herkimer Street is in good condition. Herkimer Street.

The straight track along Herkimer Street going west has several bad joints from James Street to Queen. West of Queen the track is in a similar condition to that on James Street south of the T. H. & B. crossing. From James Street to Queen, German grooved rail, and from Queen to Locke, Johnstown rail is used, and clay foundation with about 3 inches of old Macadam under ties.

The street is macadam which is below the track rails in many places and the joints are pounded and loose. The ties are laid two feet centres as far as Queen Street and James Street, and west of that point three feet centres to Locke Street. The rails from James Street to Queen Street are laid with the groove outwards, that is just the reverse way to which they were intended to be used, which gives the condition, as to operation of cars, of a T rail. The company intend renewing the curve at Queen and Herkimer Streets.

The crossover on Herkimer Street, near the corner of Locke Street, is in bad condition, the frogs and switches worn and loose at Joints. *See photos 7 and 8.* We understand, however, that when the company put down the new special work at the different points of their lines mentioned in this report, and which they have in stock, they intend making this good with the best pieces of the old special work taken up at other places.

There is clay bottom here with about 3 inches of old Macadam under the ties; the German rail is used.

The curves from Herkimer Street into Locke Street are in bad condition. The rail joints are loose, and the heads stand one above the other. The closing piece near point of tangent on west curve outer rail has been too short, leaving an opening of two Locke Street.

inches. All this special work at the corner House and at this point of the line is very much worn and loose and needs repair badly. We noticed a break in the street surface here at the inner rail of west track as though the ground was caved in. The surface has sunk to the bottom of the rail for a length of about 18 inches.

Main Street.

From the north end of the special work at car barn both tracks on Locke Street are in good condition for a Macadam street, all the way to the curves at Main Street, except at Bold Street, where the outer rail of east track has the head all broken away on the outside for a length of three feet, leaving an average width of head of only about one inch for the wheel to run on. The true width of rail head is two inches.

The curves at Main and Locke Streets are in fair condition except a low joint at point of tangent of inner rail south track, and another one on Locke Street point of curve, outer rail.

The straight tracks on Main Street to curves from Main Street to Margaret Street appear in good condition. The street surface is Macadam.

Margaret Street.

The inner guard rail on curves at Main and Margaret Streets are pretty well worn and will require to be renewed shortly.

The straight tracks on Margaret Street up to King Street West are in good condition. The street surface, however, between the rails is so washed out that the $\frac{3}{4}$ inch tie rods holding rails to gauge are exposed to view. These rods are ten feet apart.

All the ties under the rails from Herkimer Street along Locke, Main and Margaret Streets are two feet six inches centres. The two former streets are Macadam, but Margaret Street seems mostly a "dirt street."

The curves on corner of Margaret and King West are in good condition as to joints, but the outer rails on south curve are all turned with groove on outside.

King Street West.

The tracks on King Street West to Ray Street South have seven loose joints. The street is Macadam as far as Bay Street. The ties are spaced 2 feet 6 inches centres on King Street West.

At Queen Street West intersection there is one rail end split on South track outer rail, one high joint half way between Queen and Hess Street and another about 100 feet east of Caroline Street. From Ray Street to Bay Street the tracks are in good condition with the three exceptions mentioned. From Locke Street round to James Street is German 65 lb. rail.

From Bay Street to James Street the tracks along King Street West are in good condition, but the asphalt paving between these two points is in a bad state and is now being repaired by the city. The special work at James Street and King West, as previously stated, is in excellent condition.

York Street.

On York Street, from the corner of James Street, there is a loose joint on the closing piece at switch of diamond from single to double track, and there are one or two near Caroline Street, but with these exceptions the tracks are in good condition and we understand have been recently relaid and retied.

On York is the 65 lb. grooved German rail with hard gravel bottom.

The ties from James Street to Davenport Road are 2 feet centres, and from there to the end of the line are 2 feet 6 inches centres.

York Street at James Street is asphalt paved with brick be- Paving.
tween the rails from point of crossover switch to about 300 feet west and 20 inches outside each outer rail.

From McNab to Queen Street the tracks are paved with brick all over and eight inches outside each outer rail. From Queen Street to Dundurn Park the street is Macadam. Asphalt is now being put down as far as Queen Street on each side of York Street outside the brick paving. See Photo No. 9 of exposed joint and fish plate.

Stuart Street from Grand Trunk station is Macadam with cedar blocks and devil strip.

The mate of switch north track at cross over at end of tracks Stuart Street.
opposite G. T. station is loose and the closing piece is high and the gauge line not true. There is another low joint on the inner rail of north track about 40 feet east of crossover.

The brick street crossing opposite the G. T. station is very Brick street
high, being from 3 to 4 inches above rail level. See Photo No. crossing.
10.

These street crossings should always be laid level with the tops of rails.

There are ten bad joints on the grade from G. T. R. station to Bay Street.

The special work into car barn here from Main tracks is considerably worn and joints are loose. From here to James Street the tracks are in fair condition, including the crossover near James Street.

The curves at James Street from Stuart Street have loose joints which are high and do not fit close. All ties are 2 feet 6 inches centres on Stuart Street.

The track on King Street East from James Street is in good King E.
condition to the G. T. R. crossing at Ferguson Street, except Street.
two or three loose joints just east of curve from James, also from this point to Wellington Street. King Street East from the Gore to Wellington Street is asphalt paving. The track ties are 2 feet 6 inches centres.

From Wellington Street to Wentworth Street, King street is Macadam with cedar blocks between rails and on devil strip. The paving is in a bad state and collects water, but with the exception of one bad joint and outer rail north track at Victoria Street, where there is a rail and split and low joint, and another loose joint at Grand Avenue on inner rail of north track, also a low switch tongue at Wentworth Street, inner rail of north track, this line is in good condition.

From Wentworth Street to the car barn, corner of Sanford Avenue, King Street is Macadam all over. The tracks are in good condition up to the special work going into car barn, which is loose and in poor condition.

The curve off King Street East into Sanford Avenue, which line is single track, has bad joints at heel and toe of switch and heel of mate.

Sanford
Avenue.

The surface of Sanford Avenue is not paved with any material. There is a single track down it to Barton Street, connecting at Wilson Street with the Radial Railway by means of a curve. We understand that this line is not much used for passenger traffic. The track is in good condition, but we note the girder rails are turned wrong side out.

There is a toe rail crossing at Wilson Street with the Radial line to Burlington.

At Barton Street the Sanford Street line connects with the north track by means of a curve. The special work here is in bad condition, but the company are going to renew it and have the new special work at their yards ready to put down. The ties are 2 feet 6 inches centres along Sanford Street. Johnstown rail is used on Sanford Avenue.

Wentworth
Street.

There is a single track up Wentworth South to the incline. The ties are spaced three feet centres. The street is Macadam, and is low between the rails. The track is in good condition.

King E.

The tracks on King Street East, from Sanford Street up to Sherman Avenue, are in good condition except one or two loose joints, but the Macadam street surface is low in places and the water consequently lies between the rails. We understand the city have put in a sewer under the devil strip from the car barn to Sherman Avenue, and have cut the ends off the ties to within 6 inches of the inner rails. *See Photo No. 13*—shows the ties cut. The company complains of this practice, which they say occurs on different streets of the city. The persons doing the sewer work cut off the ends of the ties as above stated, and then their work is done, fill up the street again and the track sinks down on the devil strip leaving the inner rails low. We consider cutting off the ends of the ties very harmful for the keeping up of a good track, as the ties should project 18 inches outwards from the foot of the rail, but shall state our conclusions more fully later on.

The ties along King Street East are all 2 feet 6 inches centres.

The track up Sherman Avenue to incline is also in good condition. The ties are 2 feet 6 inches centres. The street is Macadam.

German rail and sandy loam bottom.

Barton Street.

From Sherman Street (the city limits) along Barton Street, going west, there are five low joints, three on north track and two on south track. The outer rail has sunk on south track and the street surface is bad about 130 feet east of Birch Street crossing with Radial Railway. The crossings and curves to Radial on Birch Street are in good condition. West of this point there are a few loose joints at Fullerton, Minto and Westinghouse Avenue.

The city were excavating while we were on the spot for a sewer near Sanford Avenue under the devil strip, and the ties were cut at this point by the contractor doing the work. *Photo No. 20* shows the condition of the ties. They are cut off within six inches of inner rail of each track.

At Sanford Avenue the curved special work is bad and is going to be replaced by the company, as previously stated.

From this point the street surface is bad and very muddy. *See Photo No. 17* when we saw it, between the rails. The rail

joints all along this street are more or less low, giving the tracks a wavy appearance, which we have tried to show in *Photo No. 16*.

Photos Nos 18 and 19 show the poor condition of the track on the wood bridge over G.T.R.

The track is low at Wellington Street, due it is said to excavations, also at Barton and James Streets.

The curves from Barton Street into James Street are in very poor condition, also the crossover just east of James Street on Barton Street, but the Company are going to replace them all with new ones and have them in stock ready to put in.

The company are going to renew the following special work on its city lines as follows:

The curves on Barton and Sanford Streets, those on Barton and James Streets, on Sherman and Main Streets, and Queen and Herkimer Streets. Also the crossovers on Barton and James Streets and King and James Streets opposite Oak Hall, Exhibit No. 2. We also understand they intend using the best parts of the special work taken up at these points for repairing the worn-out pieces at other points. Ties along Barton Street are 2 feet 6 inches centres.

We do not approve of their method of placing a single tie ^{Ties under joint.} right under each joint. We think the joints would get more support with a tie just a little back from the joint itself, but still under the fish plates, as used in steam railway practice.

The fish plates we saw were old and had been "dressed" by ^{Fish plate patent.} a blacksmith to make the rail end that was low stand up a little above the higher rail. We think if they would use fish plates which go under the foot of the rail and resting on two ties spaced as we suggest above, the joint difficulty would be considerably lessened. Mr. Trainor, the track foreman, tells us they have 6 or 7 of these joints, which have been in four years and have not moved.

We consider that the tangents or straight tracks from Guise ^{Joints.} Street along James Street north to Ferrie Street and from the T. H. & B. station along James Street south to Herkimer Street and along Herkimer Street to the car barn on Locke Street, are in the worst repair of any we saw. On Herkimer Street from James to Queen there are only a few bad joints, however. The joints are defective and cause the cars to jump off one rail and to the other, causing considerable noise. We found more defective work on these sections than on any other, and the photos we took will explain themselves.

At the places where the Company's tie ends have been cut off ^{Tie ends cut off.} by persons putting in drains, sewers, etc.

We are satisfied that it will be difficult to keep the inner rails of the track from sinking along the devil strip, thereby causing low places in the centre of the street which in wet weather would be filled with water. This in itself would not tend to either improve the street surface or track.

The company claim that they are not notified before their ties are cut, and that there are considerable lengths of their track where the ties have been cut as previously described and which are shown in the photos.

There are a number of low places that appear to have been caused by excavations from leakages of pipes or other causes, and which after being filled up again the earth has settled. We do not know if the tie ends have been cut at these places or not, not being able to tell without their being exposed to view. Those that we have reported are what we actually saw ourselves.

Low places occur as follows: On James Street near Picton Street, the corner of Stuart and James Streets, the corner of Barton and James Streets, one near the Spectator Building on James Street and one near Jackson on James Street; on Locke Street near Canada Street, on Barton and Wellington Streets, on King Street East and Catharine Street, on King Street East near Wentworth Street.

Rail Section.

Johnstown girder rail about inches deep is laid on James Street from King to Herkimer Street; on Herkimer Street, from Queen Street to Locke Street; and along Sanford Avenue. All the rest of the company's lines are, they state, laid with German rail of heavier section.

Asphalt paving.

We notice in many places where asphalt paving has been put down the paving is higher than the rails for some reason, and this prevents the water getting away from the centre of the street to the gutters, thereby making a water course of the tracks, which is decidedly detrimental. These same streets do not appear to have enough crown.

We noticed the Gore one afternoon, after a heavy rain the tracks were flooded and the water did not seem to be able to get away.

In many of the Macadam streets the surface has worn or shrunk away between the rails, leaving the rails high and making a water course of the tracks. In addition to causing water to remain on their streets, these defects are certainly hard on those who are driving vehicles over them.

Driving on Streets.

Lastly, we would like to point out that persons using the streets for driving seem to do so without regard as the side on which they are. This cannot be very safe practice in a city where there is a constant car service and considerable street traffic besides, and we feel the law regulating this should be enforced at once.

Gauge. (Width of devil strip on space between track from gauge line to gauge line of inner rails is 4 feet $2\frac{1}{2}$ inches except where centre pole bracket construction is used when it is):

Guisse Street.

Centre curve line (curve tie-rodged only).....	$\frac{1}{2}$	wide
P. T. curve north track.....	$\frac{1}{2}$	"
T. sec. rail tangent to near Hewson Street.....	$\frac{1}{2}$	"
P. C. south track.....	$\frac{1}{2}$	"
Switch crossover	$\frac{1}{2}$	"

Corner Hewson and Guisse Streets.

Gauge south track.....	To gauge
" north "	$\frac{1}{2}$ tight
Rail ends about here and girder begins.	
P. C. curve north track.....	$\frac{1}{2}$ wide
P. C. curve south track.....	To gauge

JAMES STREET.

James and Guise Streets.

Centre both curves.....	$\frac{1}{4}$ wide
P. T. west track.....	$\frac{1}{4}$ tight
East	To gauge

James and Burlington Streets.

East track	$\frac{1}{4}$ wide
West "	$\frac{1}{4}$ "

James and Wood Streets.

West track	To gauge
East "	$\frac{1}{4}$ wide

James and Macaulay Streets.

East and west track.....	$\frac{1}{4}$ wide
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James and Picton Streets.

West and east track	$\frac{1}{8}$ tight
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James and Ferrie Streets.

East and west track	To gauge
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James and Simcoe Streets.

East track	$\frac{1}{4}$ wide
West "	$\frac{1}{4}$ "

James and Strachan Streets.

West track	$\frac{1}{4}$ wide
East "	$\frac{1}{4}$ "

G. T. Bridge.

West track	$\frac{1}{4}$ tight
East "	$\frac{1}{4}$ wide

James and Stuart Streets.

East and west track	$\frac{1}{4}$ tight
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James and Murray Streets.

East track	$\frac{1}{4}$ wide
West "	$\frac{1}{4}$ "

James and Barton Streets.

East and west track	$\frac{1}{4}$ wide
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From Stuart Street on James to Hunter Street, or T. H. & B. crossing, there are about 75 tie rods.

James and Colborne Streets.

East and west track.....	$\frac{1}{4}$ wide
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James and Robert Streets.

West track	$\frac{1}{4}$ wide
East "	To gauge

James and Mulberry Streets.

East track	To gauge
West "	$\frac{1}{4}$ wide

James and Cannon Streets.

East track	To gauge
West "	$\frac{1}{4}$ wide

James and Vice Streets.

East track	$\frac{1}{4}$ wide
West "	$\frac{1}{4}$ tight

<i>James and Gore Streets.</i>		
East track	.....	$\frac{1}{4}$ wide
West "	.....	$\frac{1}{8}$ tight
<i>James and Merrick Streets.</i>		
East track	.....	$\frac{1}{2}$ wide
West "	.....	To gauge
<i>James and Rebecca Streets.</i>		
East and west track	.....	To gauge
<i>James and King William Streets.</i>		
East and west track	.....	To gauge
<i>James and King Streets.</i>		
East track	.....	$\frac{1}{4}$ wide
West "	.....	To gauge
<i>James and The Gore Streets.</i>		
East and west track	.....	$\frac{1}{4}$ wide
<i>James and Main Streets.</i>		
East track	.....	$\frac{1}{4}$ wide
West "	.....	To gauge
<i>James and Jackson Streets.</i>		
East track	.....	$\frac{3}{4}$ wide
West "	.....	To gauge
<i>James and Hunter Streets.</i>		
East track	.....	$\frac{1}{4}$ wide
West "	.....	To gauge
<i>James and Bold Streets.</i>		
East track	.....	$\frac{1}{4}$ tight
West "	.....	To gauge
<i>James and Augusta Streets.</i>		
East and west track	.....	To gauge
<i>James and Duke Streets.</i>		
East track	.....	$\frac{1}{2}$ tight
West "	.....	To gauge
<i>James and Yonge Streets.</i>		
East and west track	.....	To gauge
<i>James and Robertson Streets.</i>		
East and west track	.....	$\frac{1}{4}$ tight
<i>James and Maria Streets.</i>		
East and west track	.....	To gauge
<i>James and Hannah Streets.</i>		
East track	.....	$\frac{1}{4}$ wide
West "	.....	$\frac{1}{8}$ "
<i>James and Herkimer Streets.</i>		
East track	.....	To gauge
West "	.....	$\frac{1}{4}$ wide
James Street is tie-rodged from Hunter to Herkimer.		
Incline Track.—		
East track, just below south frog (double track)	.....	To gauge
West "	.....	Tight
Single track	.....	$\frac{1}{4}$ wide
6a R.M.		

James and Parkland Streets.

Tie-rodded about half way to.....To gauge

STUART STREET.

P. C. north track $\frac{1}{4}$ tight
 South track $\frac{1}{4}$ wide

Stuart and McNab Streets.

North and south track..... $\frac{1}{4}$ wide,

Stuart and Bay Streets

North trackTo gauge
 South " $\frac{1}{4}$ wide

Stuart and Tiffany Streets.

South trackTo gauge
 North " $\frac{1}{4}$ tight

HERKIMER STREET.

Herkimer and James Streets.

North curve $\frac{1}{4}$ wide
 South " $\frac{1}{4}$ "
 P. T. south track..... $\frac{1}{4}$ tight
 North "To gauge

Herkimer and McNab Street.

North track1-16 tight
 South " $\frac{1}{4}$ tight

Herkimer and Park Streets.

South trackTo gauge
 North " $\frac{1}{4}$ tight

Herkimer and Bay Streets.

North and south track..... $\frac{1}{4}$ tight

Herkimer and Caroline Streets.

North and south track..... $\frac{1}{4}$ tight

Herkimer and Hess Streets.

South track Herkimer St. is tie-rodded from.....To gauge
 North " James to Hess $\frac{1}{4}$ tight

Herkimer and Queen Streets.

North track P. C. curveTo gauge
 South " $\frac{1}{4}$ wide

Herkimer and Queen Streets.

South track P. C.To gauge
 North ""
 P. T. curve, south track"
 North track $\frac{1}{4}$ wide

Herkimer and Kent Streets.

South trackTo gauge
 North ""

Herkimer and Locke Streets.

P. C. south curve, HerkimerTo gauge
 P. C. north " (tube renewed)..... $\frac{1}{4}$ tight

LOCKE STREET.

At car barn curve,—

East trackTo gauge
 West " $\frac{1}{4}$ wide

<i>Locke and Hannah Streets.</i>	
East and west track	To gauge
<i>Locke and Chatham Streets.</i>	
East and west track	To gauge
<i>Locke and Tuckett Streets.</i>	
East and west track	To gauge
<i>Locke and Melbourne Streets.</i>	
East and west track	To gauge
<i>Locke and Pine Streets.</i>	
East and west track	To gauge
<i>Locke and Bold Streets.</i>	
East track	To gauge
West "	$\frac{1}{4}$ wide
<i>Locke and Hunter Streets.</i>	
West track	To gauge
East "	$\frac{1}{8}$ tight
From Hunter to Main Locke is tie-rodged.	
<i>Lacke and Canada Streets.</i>	
East and west track.....	To gauge
<i>Locke and Jackson Streets.</i>	
East and west track.....	To gauge
<i>Locke and Main Streets.</i>	
P. C. curve west track.....	To gauge
P. C. " east "	$\frac{1}{8}$ tight
MAIN STREET.	
<i>Main and Locke Streets.</i>	
P. T. curve south track.....	To gauge
P. T. " north "	$\frac{1}{8}$ tight
<i>Main and Margaret Streets.</i>	
P. C. curve south track.....	$\frac{1}{4}$ tight
P. C. " north "	$\frac{1}{4}$ wide
MARGARET STREET.	
<i>Margaret and Main Streets.</i>	
P. T. curve west track	To gauge
P. T. " east "	$\frac{1}{4}$ tight
<i>Margaret and King Streets.</i>	
P. C. curve east and west track	$\frac{1}{8}$ tight
KING WEST.	
<i>King W. and Margaret Streets.</i>	
P. T. north and south curve	To gauge
<i>King W. and Locke Streets.</i>	
North track	$\frac{1}{2}$ wide
South "	To gauge
<i>King W. and Pearl Streets.</i>	
North and south track	$\frac{1}{4}$ tight
<i>King W. and Bay Streets.</i>	
North track	$\frac{1}{4}$ tight
South "	To gauge

		<i>King W. and Queen Streets.</i>	
North and south track	.....		To gauge
		<i>King W. and Hess Streets.</i>	
North and south track	.....		To gauge
		<i>King W. and Caroline Streets.</i>	
North and south track	.....		$\frac{1}{8}$ tight
		<i>King W. and Bay Streets.</i>	
North and south track from Main to Bay is all tie-rodded.....			To gauge
		<i>King W. and Park Streets.</i>	
North and south track	.....		To gauge
		<i>King W. and Charles Streets.</i>	
South track.	No tie rods from Bay Street to.....		$\frac{1}{4}$ wide
North	“ James Street.....		$\frac{1}{4}$ tight
		<i>King and McNab Streets.</i>	
South track.	Tie-rodded from McNab to.....		$\frac{1}{8}$ tight
North	“ Dundurn Street.....		To gauge
YORK STREET.			
		<i>York and McNab Streets.</i>	
North track	.....		$\frac{1}{8}$ wide
South	“		To gauge
		<i>York and Park Streets.</i>	
North and south track	.....		To gauge
		<i>York and Bay Streets.</i>	
North and south track	.....		To gauge
		<i>York and Caroline Streets.</i>	
North track (tie rods lying on sidewalk).....			To gauge
South	“ (taken out by City).....		
		<i>York and Hess Streets.</i>	
North track (To gauge beyond paving).....			$\frac{1}{4}$ wide
South	“		$\frac{1}{4}$ “
		<i>York and Hess Streets.</i>	
South track	.....		$\frac{1}{4}$ wide
North	“		To gauge
		<i>York and Oxford Streets.</i>	
North track	.....		To gauge
South	“		$\frac{1}{8}$ tight
About five or six bad joints here. Macadam paving worn next rails and between them.			
		<i>York and Bay Streets.</i>	
South track	.....		$\frac{1}{8}$ tight
North	“		To gauge
		<i>York and Locomotive Streets.</i>	
South track	.....		To gauge
North	“		$\frac{1}{8}$ tight
		<i>York and Pearl Streets.</i>	
North track	.....		$\frac{1}{8}$ tight
South	“		To gauge
		<i>York and Crooks Streets.</i>	
North track	.....		To gauge
South	“		$\frac{1}{8}$ tight

York and Locke Streets.

North track	.....	To gauge
South "	.....	$\frac{1}{4}$ wide

York and Inchberry Streets.

South track	.....	To gauge
North "	.....	$\frac{1}{8}$ tight

York and Sophia Streets.

North and south tracks	To gauge
------------------------	-------	----------

York and Devenport Streets.

North track	.....	$\frac{1}{8}$ tight
South "	.....	To gauge
Near curve at north track	.....	"
Dundurn Park south	.....	$\frac{1}{4}$ wide
Curve pretty well worn.		

York and Dundurn Streets.

North and south tracks	.....	$\frac{1}{4}$ wide
York tie-rodged from McNab to cemetery, Dundurn.		

York Street.

Near Dundurn Street on single track all through to end of track	.....	$\frac{1}{2}$ wide
All gauges 4' 6 $\frac{1}{2}$ ".		

BARTON STREET.*Barton and Sherman Streets.*

North and south track street low in middle	To gauge
--	-------	----------

Barton and Kinrade Streets.

South track	.....	$\frac{1}{4}$ wide
North "	.....	To gauge

Barton and Earl Streets.

South track	.....	$\frac{1}{8}$ tight
North "	.....	To gauge

Barton and Chestnut Streets.

South track	$\frac{1}{4}$ wide
North "	To gauge

Barton and Gibson Streets.

North and south track	To gauge
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Barton and Birch Streets.

South track	$\frac{1}{4}$ wide
North "	To gauge

Barton and Fullerton Streets.

North and south tracks	$\frac{1}{8}$ tight
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Barton and Milton Streets.

North track	To gauge
South "	$\frac{1}{8}$ tight

Barton and Minto Streets.

North track	.....	$\frac{1}{8}$ tight
South "	.....	To gauge

Barton and Brant Streets.

South track	.....	$\frac{1}{8}$ tight
North "	.....	To gauge

Barton and Simford Streets.

North track	.....	To gauge
South "	.....	$\frac{1}{8}$ tight

Barton and Wentworth Streets.

North and south tracks	To gauge
------------------------	-------	----------

Barton and William Streets.

South track	.....	$\frac{1}{8}$ tight
North "	.....	To gauge

Barton and Leeming Streets.

North track	.....	To gauge
South "	$\frac{1}{8}$ tight

Barton and Cheever Streets.

North and south tracks	To gauge
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Barton and Mathews Streets.

North track	To gauge
South "	$\frac{1}{4}$ wide

Barton and Smith Streets.

North track	.....	$\frac{1}{8}$ tight
South "	.....	1-16 tight

Barton and Oak Streets.

North and south tracks	To gauge
------------------------	-------	----------

Barton and

North and south tracks	To gauge
------------------------	-------	----------

Barton and Emerald Streets.

North and south tracks	To gauge
------------------------	-------	----------

Barton and East Streets.

North and south tracks	To gauge
------------------------	-------	----------

Barton and Victoria Streets.

South track	$\frac{1}{4}$ wide
North "	To gauge

Barton and West Streets.

North and south track	$\frac{1}{4}$ wide
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Barton and Euclid Streets.

North track	$\frac{1}{4}$ tight
South "	1-12 wide

Barton and Wellington Streets.

North track	.....	To gauge
South "	.....	$\frac{1}{4}$ tight
N. R. crossing north track	.....	$\frac{1}{4}$ wide
G. T. " south "	.....	1-16 tight

Barton and Elgin Streets.

North track. Street better here more	$\frac{1}{4}$ wide
South "	To gauge

Barton and Mary Streets.

North and south track	To gauge
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Barton and Catherine Streets.

North and south track	To gauge
-----------------------	-------	----------

Barton and John Streets.

North and south track	To gauge
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Barton and Highson Streets.

North track	$\frac{1}{8}$ wide
South "	To gauge

Barton and James Streets.

North track P. C. curve	.....	$\frac{1}{8}$ wide
South "	.....	1-16 tight

King East Street.

Will all be taken up in spring as far as car barn.

King and James Streets.

P. C. South track, one or two bad jointsTo gauge
North track, at old crossover $\frac{1}{8}$ wide

King E. and Hewson Streets.

North and south track (asphalt too high between rails)..... $\frac{1}{8}$ tight

King E. and John Streets.

North and south trackTo gauge

King E. and Catherine Streets.

North and south track.....To gauge

King E. and Mary Streets.

North and south track.....To gauge

King E. and Walnut Streets.

South trackTo gauge
North " $\frac{1}{8}$ wide

King and Ferguson Streets.

North and south track.....To gauge

King E. and Cathcart Streets.

North and south track.....To gauge

King E. and Spring Streets.

North track $\frac{1}{8}$ wide
South "To gauge

King E. and Wellington Streets.

North and south track..... $\frac{1}{8}$ wide

King E. and West Streets.

South trackTo gauge
North " $\frac{1}{8}$ tight

King E. and Victoria Streets.

North and south track.....To gauge

King E. and East Streets.

North and south track.....To gauge

King E. and Emerald Streets.

North and south track.....To gauge

King E. and Tisdale Streets.

North and south track.....To gauge

King E. and Sterens Streets.

North and south track.....To gauge

King E. and Ashley Streets.

South track1-16 tight
North "To gauge

King E. and Grant Streets.

South and north track.....To gauge

King E. and Wentworth Streets.

North and south track P. C. curve..... $\frac{1}{8}$ tight

King E. and Wentworth Streets (Centre).

North track $\frac{1}{8}$ tight
 South "To gauge

King E. and Sanford Streets East of Barn.

North and south track.....To gauge

King E. and Arthur Streets.

South track $\frac{1}{8}$ tight
 North " Street surface low.....To gauge

Half-way between Arthur and Sherman.

North and south track.....To gauge

King E. and Sherwin Streets.

North and south track C. P.....To gauge
 King E. is tie-rodde*d* from Wellington to Sherman Avenue (both tracks).

Sherman. (Tie ends cut all along here.)

Sherman and King E. Streets.

P. T. curve east track..... $\frac{1}{4}$ wide
 P. T. curve west track (wheels bearing on grooves)..... $\frac{1}{4}$ "

Half-way between King and Main Streets.

East trackTo gauge
 West " $\frac{1}{8}$ wide

Sherman and Main Streets.

North of single track:

East track $\frac{1}{8}$ tight
 West "To gauge
 Single ""

WENTWORTH (Single track).

Wentworth and King E. Streets.

Centre curve east and west track..... $\frac{1}{4}$ wide
 At frog of double into single..... $\frac{1}{8}$ tight
 At P. S. $\frac{1}{4}$ wide

Wentworth and Aikman Streets.

Single track rubbing on groove, no tie rod from King E. to Main, but Main
 to end has tie rods $\frac{1}{4}$ wide

Wentworth and Main Streets.

Single track $\frac{1}{4}$ wide
 Juct. above MainTo gauge

Wentworth and Ida Streets.

East trackTo gauge
 West " $\frac{1}{8}$ wide

Wentworth and Stinson Streets.

East and west track..... $\frac{1}{8}$ wide

TWENTY-FIVE 16 FOOT CLOSED CARS.

The 25 cars numbered from 35 to 59 (both numbers inclusive) are 16 foot closed cars purchased in 1892.

Trucks and
Motors.

Car No. 40 has a Blackwell truck and G. E. 800 motors. The others have Brill trucks and No. 3 Westinghouse motors.

Brakes.

Fenders.

All cars referred to in this report have hand brakes only and are equipped with the Sleeman fender.

Condition
Cars No. 35, 41,
48, 54 and 55.

Are in the company's yard at the corner of King East and Sanford Avenue. The appearance of these cars outside is better than the average. Inside the doors are in bad shape and the upholstery is worn and dingy in appearance, and in some cases dilapidated.

Their trucks and motors are in use under summer cars.

Car bodies No.
37, 38, 43, 44, 46,
47, 51, 56 and 57.

Are in the company's car house, corner Stuart and James Streets without trucks or motors, and need repairs, overhauling, repainting, varnishing, etc. We understand these cars are waiting their turn to go into the shops before winter.

Car bodies
Nos. 42 and 59

Appearance is good, both inside and out.

Car 39

Has both trucks and motors.

Car No. 36

Has been recently repainted, floor too open (space between trap doors).

Car No. 45

In shop for repairs to motors, the outside appearance of the car is not too bad, the wooden strips between car body and truck, as on most of these Hamilton cars, is not painted. The inside of this car is dark and smoky and needs repainting, and the floor is in bad repair.

Car No. 40

In the company's yard, King East and Sanford Avenue, when inspected. It is in a dilapidated condition, both inside and out. Cross bars of truck supporting motors are badly constructed. The entire car needs a complete overhauling, repainting, etc.

Car No. 49

In for repairs and repainting.

Trucks at present in bad shape (car journal box covers carried away, not replaced).

Car No. 50.

Armatures removed, car replaced by open car. Trucks in bad shape and need repainting. Covers off car journal boxes (one replaced by piece of tin).

Car No. 53.

Appearance of car old and dirty.

Car No. 52.

Being repainted in yard.

In operation between Herkimer and Incline on James Street S. Floor in bad shape between trap doors, two panels broken under seats; appearance fair outside, but dingy inside.

FIVE CLOSED CARS, NUMBERED 60 TO 64.

(Both numbers inclusive), are 18 feet long and were purchased in 1893.

Trucks.

Numbers 60, 61, 63 and 64 have Taylor trucks. No. 62 has a Blackwell truck.

Motors.

Numbers 60, 61, 62, 63 have No. 3 Westinghouse motor equipment. Of these cars 60, 61 and 63 the bodies only are in car house, Stuart and James; of 61, the floor is in bad shape.

Car No. 62.

Operating on line. Motors are too noisy and gears have sound of being too much worn.

Operating on King Street East. Appear dilapidated. Trucks Car No. 64.
in bad shape; top or truck badly bowed or sprung. (See photo 21.)
Sleeman fender stands (12 inches) twelve inches from top of
rail. (See photo No. 22.)

THE TWELVE CLOSED CARS, Nos. 105 to 116 (inclusive).

Are 20 feet long and were purchased in 1904.

Car No. 13

Has a Taylor truck.

Trucks.

The others have Peckham trucks.

Number 105, 106, 107, 109, 111, 115 and 116 have G. E. 800
motor equipments.

Number 108, 110, 112, 113 and 114 have G. E. 1,000 motor Motors.
equipments.

Dilapidated in appearance inside and out. Cracks in outside, Car No. 105.
Car has appearance of coming to pieces. Ceiling is bad, and there
is hole in floor trap door.

Ventilator glass and front window broken. Motors apparently
in bad shape.

One gear case worn through, showing knife edge gears. (See
photo No. 24.)

Both axle collars are tied in place with sticks and wire. (See
photo No. 23.)

This equipment is a sample of car repairs not being kept up
and not mechanically made, and is a condition accounting largely
for a great deal of unnecessary noise.

This car in operation later on James Street South, has a flat
wheel, gears are much worn and the whole thing should be properly
classed as about played out.

In for repairs to motors and controllers. This car has electric Car No. 106.
heaters.

It is old and needs repairing and repainting.

Trucks are in bad shape and sprung out of true. Car frame
has also sprung so floor is uneven.

Being repainted in shop and has electric heaters.

Car No. 108
(body only).

In operation, has electric heaters.

Car No. 109.

This car 109 and car 116. Gears are too noisy, ventilator
glasses broken, floors in bad shape, holes in trap door, need paint-
ing inside and out, another one falling to pieces. Both these entire
cars should be overhauled and rebuilt.

Is being repaired.

Car No. 111

In yards, King East and Sanford (to be repainted); has electric Car No. 112.
heaters.

Are in yard, King East and Sanford (to be overhauled), and Car No. 114
are generally in bad condition. and 115.

Fourteen cars, numbers 21, 22, 23, 27, 28, 31, 32, 33, 34, 83, Cars.
84, 85, 86, 87 and 88 are nine bench open cars converted from old
horse cars, mostly rebuilt by a firm in Hamilton (Hoodless & Sons).

These cars do not comparatively present such a bad appear-
ance, except where curtains are put in a slovenly manner (see photo
No. 26), and in some cases the front windows are held up with little
pieces of stone. Some of the gears are too much worn and make
entirely too much noise, while others run very smoothly. This

latter is the condition with car No. 21, while No. 22 is very noisy and curtains look very slovenly and uninviting.

Car 85. Rather poor in appearance, curtains badly rolled up, and windows held in place by small stones; needs repainting.

These cars have side rope guards.

The ten bench open cars numbered from 85 to 74 (both inclusive) were purchased in 1893.

Car No. 65. Operating from Herkimer to Gore; has wood side guard, Sleeman fender too high; car body is in fairly good condition; trucks and motor running smoothly.

Car No. 66. Trucks and motors removed from body of car for repairs on truck; has one flat wheel; motors have gear cases on and in fair repair; car body is in comparatively good shape.

The paint is fresh, except where water has come through ceiling. The side rope guard is used.

Car 67. Is in fairly good shape and appearance; it is in the yard at King East and Sanford Avenue. Side guard consists of 1 in. x 3 in. yellow pine piece.

Car No. 68. Operating to Victoria Park; has one flat wheel; gears a good deal worn; car body in fair shape, but not kept clean. Floor in bad shape about motor doors; side rope guard; Sleeman fender too high.

Car No. 70. In car house for repairs. Two controllers and motors; one gear slightly worn, other nearly new; car body and trucks in good shape; has side rope guard.

Car No. 71. In operation on James Street and Herkimer line. Body dirty, needs painting; Sleeman fender too high; wooden side guard; controller covers are dilapidated and tied up with leather rope cord; truck running smoothly except slightly flat wheel; car starts easily.

Car No. 74. Appearance of body good, except floor badly worn; controller cover burnt through and tied on with leather bell cord; has rope side guard. Photo No. 25 shows tin cover on car journal box.

The five ten bench open cars, Nos. 100 to 104 (both inclusive), were purchased in 1904, are comparatively new and in good shape, except on car No. 100. The gear on one motor of this car sounds as though slightly out of alignment. These cars have wooden side guards. Sleeman fenders, which are too high. They start and run very smoothly.

The equipment and trucks for all of these are taken from closed cars. They are belonging to the Radial Railway and leased to the Hamilton Street Railway Co. Five double truck, ten bench open cars, equipped with John Stevenson's trucks and 4 G. E. 800 motors. These trucks are of short wheel base and are operated most of the time on the Dundas Road, but are occasionally put into Street Railway service.

The two closed cars, Nos. 117 and 118, are also owned by the Radial and leased to the Street Railway, where they are operated. They are equipped with the Laconia short wheel base double trucks and 4 G. E. 800 motors.

The two open cars, Nos. 24 and 26, are leased from the Dundas Railway Co. Car No. 24 has two John Stevenson short base trucks

and No. 26 has two Taylor short base trucks. Both these are equipped with general electric G. E. 1000 motors.

The Dundas through cars are operated on James and Herkimer Streets only. They are double truck interurban and are No. 120, 135 and 220. These are equipped with general electric G. E. 100 motors.

Are used on all cars. The best practice dictates the use of Car fuses. properly adjusted car circuit breakers.

The speed of cars, according to the schedule, which we feel is Car speeds. pretty well followed, is for—

Locke St.	7.9 miles per hour.
York St.	10.0 " "
Barton and Sherman Sts.	7.4 " "
G. T. R. Station	7.14 " "
Wharves	8.1 " "
Wentworth	9.0 " "

and includes all stops.

The maximum speed taken was 25.7 miles per hour. We feel this speed is made necessary in places to live up to the time table as above. (See Exhibit No. 3.)

We believe with the exception of car No. 125 on the Radial Railway, which is equipped with air brakes, that no other electric cars operating in or around Hamilton have any other than hand brakes.

The fenders are all of the Sleeman type.

These are carried from 6 in. to 14 in. higher than the rail.

They have a tripping device projected and carried slightly in front of the fender and arranged to drop the fender, by working levers, when coming in contact with an object. This is supposed to be automatic. This fender, the ease with which it drops, the high pavements, and the tetering of short cars offer serious objections to adjusting these fenders any lower. The Street Railway Company say if carried lower they trip and roll up under the cars.

On the other hand, as carried so high, 6 in. to 14 in. above the rail (the majority of them about 10 in. to 12 in. above), they would pass over a man or child fallen across the tracks in front of the car.

These fenders are arranged also to trip by a hand lever coming up through the car platform floor, which should preferably be a foot trip. We would recommend a fender that could be carried constantly closer to the street.

We feel the importace of this demands the co-operation of the municipality and Street Railway. As it is a question concerned largely with proper street paving and crossings.

The cars are heated in several instances by electric heaters, but generally are arranged for heating by stoves.

Electric heaters for all cars would be a decided improvement.

Rope side guards are used on some cars and a wooden strip on others, and are changed from one side to the other, as the car presents alternate sides to the devil strip.

Connections at
Gore.

Our observations are that close good connections are made at the Gore and very little time is lost.

York Street.

At the time we took observations on York Street two cars well in operation and the service was adequate for the amount of traffic.

TO RECAPITULATE.

We feel with perfect impartiality that track faults, as enumerated, show track repairs not properly kept up.

That unnecessary and disagreeable noise is largely caused thereby.

Cars, trucks
and motors.

That the same thing applies to the cars, trucks and motors.

Brakes.

The appearance of most of the car bodies is bad.

We think the brakes used are *inadequate* for the speeds which seem to be necessitated to maintain the schedules now in force, and would recommend air to some equally quick acting brakes.

Sand boxes.

We regard a proper device for sanding the track of the utmost importance, and think same should be adopted on all cars.

Fenders.

We also regard the fenders as inadequate for the purposes intended and must condemn them. Fenders far more suitable are to be obtained.

Side ropes and
wooden strip
side guards.

These only answer in the smallest degree as a protection against cars passing in the opposite direction.

Where the cars come so close together as these (see photos 3A., 4A. and 5A.) one side of the car should be entirely shut off from ingress and egress, no running boards should be used on this side and it should be constantly kept towards the devil strip.

Signs.

The signs on the cars are not very conspicuous and proper ones should be erected or painted thereon showing their destination.

Hardships to
Street Railway.

Regardless of agreements which may exist between the municipality and the Street Railway Co. and the former's rights in the matter, we consider such things as cutting ends of ties, undermining tracks, the improper crowning and paving of streets, high street crossings, and the failure of the city to enforce the statute "rule of the road," as decided hardships on the Street Railway. (See Exhibit 4 and photos 1A. and 2A.)

In conclusion we feel the conditions of growth and increasing population of Hamilton warrant an up-to-date street railway service, and that the municipality and Street Railway should co-operate to this end.

We are yours very respectfully,

H. W. MIDDLEMIST.

P. H. WYSE.

FORT WILLIAM, 29th September, 1906.

*The Ontario Railway Commission and Municipal Board,
Toronto:*

GENTLEMEN,—Re the Grand Trunk Pacific—Lake Superior Branch. With Mr. Knowlton of the Railway Co., I inspected the first seventy-one miles of the branch.

From Fort William to about mile 63, The Grand Trunk Pacific Railway parallels The Canadian Pacific Railway, which on account of the topography of the country appears unavoidable.

The Canadian Pacific Railway have eleven stop and flag stations between Fort William and Linko (a distance of 60 miles) for local passengers and freight, giving an average distance between stopping points of $5\frac{1}{2}$ miles (approx.).

The Grand Trunk Pacific Railway propose to put in nine sidings between Fort William and Mile 63, which is approximately opposite to Linko. This would give an average distance between sidings of seven miles.

With the fact in view, of the close proximity of the two roads, the relative positions of the sidings, and the thinly populated country, I believe the accommodation for the public, as far as stopping places are concerned, will be ample.

West of Mile 28, the country is barren and practically unpopulated.

At Mileage 14, 21 and 28 (corresponding to Neebing, Kakabeka and Kaministiquia respectively), I would suggest combination station buildings. At the other points, platforms and any offices required by the Company for the operation of their road would suffice until the country is opened up.

I would therefore recommend that the Board give their sanction to the proposed location of the sidings.

I have the honor to be, gentlemen,
Your obedient servant,

R. S. ELMSLEY.

THE ONTARIO RAILWAY AND MUNICIPAL BOARD.

Before

JAMES LEITCH, Esq., K.C.,
Chairman;
A. B. INGRAM, Esq.,
Vice-Chairman, and
H. N. KITTSOX, Esq.,
Member.

Thursday, the ninth day of October.
A.D. 1906.

In the matter of the Application of the Municipal Corporation of the City of St. Thomas for the Approval of the By-law, Rules and Regulations of the St. Thomas Street Railway.

Upon the application of the said Corporation and upon perusing the by-laws, rules and regulations for The St. Thomas Street Railway, filed.

This Board doth order that the said by-laws, rules and regulations, filed, be and the same are hereby sanctioned and approved under and in pursuance of Section 153 of "The Ontario Railway Act, 1906."

(Sgd.) JAMES LEITCH,
Chairman of the Ontario Railway and Municipal Board.

THE ONTARIO RAILWAY AND MUNICIPAL BOARD.

Before

JAMES LEITCH, Esq., K.C.,
Chairman;
A. B. INGRAM, Esq.,
Vice-Chairman, and
H. N. KITTSON, Esq.,
Member.

Tuesday, the ninth day of October,
A.D. 1906.

In the matter of the application of the Municipal Corporation of the City of St. Thomas for the approval, under Section 221 of "The Ontario Railway Act, 1906," of Charles Johns, of the City of St. Thomas, Manager of The St. Thomas Street Railway, as an Examiner of Motormen for the said Corporation's said Railway.

Upon the application of the Municipal Corporation of the City of St. Thomas and upon considering the evidence adduced on behalf of the applicants.

This Board doth order that the appointment of the said Charles Johns, of the City of St. Thomas, in the Province of Ontario, Manager of The St. Thomas Street Railway, as an Examiner of Motormen for the said Railway be and the same is hereby approved, under and in pursuance of Section 221 of "The Ontario Railway Act, 1906."

(Sgd.) JAMES LEITCH,
Chairman of the Ontario Railway and Municipal Board.

THE ONTARIO RAILWAY AND MUNICIPAL BOARD.

Before

JAMES LEITCH, Esq., K.C.,
Chairman;
A. B. INGRAM, Esq.,
Vice-Chairman, and
H. N. KITTSON, Esq.,
Member.

Monday, the fifteenth day of October,
A.D. 1906.

In the matter of the application of The Toronto Suburban Railway Company for the approval, under Section 221 of "The Ontario Railway Act, 1906," of George C. Royce, of the Town of Toronto Junction, Manager of the said Company, as an examiner of Motormen under said Section of said Act.

Upon the application of The Toronto Suburban Railway Company, upon hearing what was alleged by the Applicants, and upon examining the said George C. Royce.

This Board doth order that the Appointment of the said George C. Royce, of the Town of Toronto Junction, in the County of York and the Province of Ontario, Manager of The Toronto Suburban Railway Company, as an Examiner of Motormen for the said Company, be and the same is hereby approved under and in pursuance of Section 221 of "The Ontario Railway Act, 1906."

(Sgd.) JAS. LEITCH,
Chairman of the Ontario Railway and Municipal Board.

THE ONTARIO RAILWAY AND MUNICIPAL BOARD.

Before

JAMES LEITCH, Esq., K.C.,

Chairman;

A. B. INGRAM, Esq.,

Vice-Chairman;

H. H. KITTSON, Esq.,

Member.

Thursday, the eleventh day of October,
A.D. 1906.

Between the City of London, Applicants, and the London Street Railway Company, Respondents.

INTERIM ORDER.

The application or complaint herein coming on for hearing before the Board, pursuant to appointment, at the Court House in the City of London, on Thursday, the eleventh day of October, 1906, at one o'clock in the afternoon, and by adjournment at eight o'clock in the afternoon:

Upon hearing certain evidence given on behalf of the applicants by Moyes, Civil Engineer; upon a personal inspection by the Board of the Wellington Street bridge, being the respondents' bridge in the City of London, particularly complained against by the applicants, and upon hearing what was alleged by counsel for both parties;

The Board orders and directs as follows:—

1. That the respondents be permitted to use such Wellington Street bridge inspected by the Board for their ordinary car service, running their cars across the same at the rate of not more than four miles per hour, and slackening their speed at least fifty feet from the south end of said bridge.

2. That the applicants proceed immediately to repair the said Wellington Street bridge by taking out the decayed ties and replacing them with new ones, and by jacking up the stringers and putting in shims, using plank not less than two inches in thickness and four feet long for that purpose.

3. That the whole deck of the said bridge be overhauled and permanently repaired and the old guard rails replaced by a new wooden guard faced with angle iron, within six months from the date hereof.

4. That the said repairs be made, under and subject to the direction, inspection and approval of the applicants' city engineer.

The Board reserves the question of costs and further order, herein, until an inspection shall have been made by an engineer appointed by the Board, or until such inspection shall be dispensed with by agreement between the parties or the direction of the Board.

(Sgd.) JAS. LEITCH,
Chairman of the Ontario Railway and Municipal Board.

THE ONTARIO RAILWAY AND MUNICIPAL BOARD.

Before

JAMES LEITCH, Esq., K.C.,
Chairman;

A. B. INGRAM, Esq.,
Vice-Chairman;

H. H. KITTSON, Esq.,
Member.

Thursday, the eleventh day of October,
A. D. 1906.

Between the City of London, applicants, and the London Street Railway Company, Respondents.

ORDER APPOINTING ENGINEER.

The application or complaint herein coming on for hearing this day before the Board pursuant to appointment at the Court House in the City of London at one o'clock in the afternoon, and by adjournment at eight o'clock in the afternoon, in the presence of the parties hereto and the respondents having consented and agreed to the inspection of the construction and equipment of their railway by an inspecting engineer, to be appointed by the Board and to abide by his report and directions, and it appearing that the portions of the respondents' railway are dangerous to the public using the same, from want of renewal or repair, or insufficient or faulty construction, equipment or other cause.

The Board hereby appoints James C. Royce, Esq., of the City of Toronto, in the County of York, Consulting engineer, to inspect the state of repair, construction and equipment of the above named respondents' railway and to report to the Board and make directions, after the completion of said inspection; and the said James C. Royce is hereby ordered to proceed forthwith and make and complete the said inspection and report.

(Sgd.) JAMES LEITCH,

Chairman of Ontario Railway and Municipal Board.

THE ONTARIO RAILWAY AND MUNICIPAL BOARD.

Between the Corporation of the City of London, Applicant, and the London Street Railway Company, Respondents.

Report of James C. Royce, Inspecting Engineer, appointed by the Board in the above matter.

Pursuant to the order of the Board made in this matter and bearing date the 11th day of October, A.D. 1906, I have inspected the London Street Railway and now beg to report and direct as follows:—

The object of the inspection was to determine what repairs, if any, are necessary to put the London Street Railway system in such a condition as to properly serve the public convenience and to insure, as far as possible, the public safety.

In order to show clearly the lay-out of the system, a map is furnished herewith on which the double track, single track and turn-outs are indicated by full and dotted lines.

On referring to this map it will be noticed that there are three branches extending to outlying districts; namely, one extending east of Dundas

Street about one and one-quarter miles east of Dorinda Street; another extending north on Dorinda Street; another extending north on Richmond Street about three-quarters of a mile north of Regent Street, and a third running westerly along the Thames River to a locality known as Springbank Park which is a distance of about four and one-half miles from the city. The latter is a double-track line running on a private right of way west of Wharnecliffe Highway.

TRACK.

The Girder Groove Rail is used throughout the system with the exception of the following sections which are laid with "T" rails: namely, the section from the bridge west on Dundas Street north on Wharnecliffe Highway and east on Oxford Street to Gunn Street, the section on Richmond Street north on Regent Street, the section on Dundas Street east of Dorinda Street, the section recently built on Wharnecliffe Highway south of Askin Street and running via Elmwood Street, Edwards, Briscoe, Wortley, Garfield and Ridout Streets to Grand Avenue and the Springbank Park line.

The section of track on Richmond Street north of Regent Street is not in good condition. A number of the ties were badly decayed and track bolts loose in places. I therefore direct that the decayed ties in this section be replaced by new ties before June the 1st, 1907, and that the track bolts be tightened up and sound ties put in at bad joints forthwith.

All switches and frogs were examined and found to be more or less badly worn with a few exceptions and some track joints on Dundas Street, especially at the block paved section, on Oxford Street east of Colborne Street and on Richmond Street south of Dundas Street, were in an unsatisfactory state of repair. There was also a defective joint at the juncture of the "T" and Girder Groove Rails west of Dundas Street bridge and one at the Canadian Pacific Railway diamond on Richmond Street.

I direct that the switches and frogs be repaired and renewed as the case may be and that the joints referred to above be repaired or raised where any depression occurs. I also direct that guard rails and tie rods be put in the curve located on Dundas Street between Ridout Street and the bridge especially as this curve is located on a grade where a car is liable to attain some speed. The rails at this point do not fit the curve and the gauge was unnecessarily wide.

SPRINGBANK PARK LINE.

A portion of this line near the city is to be shifted a few hundred feet south to make room for the shifting of the Grand Trunk Railway Company's main line and of course will be re-laid.

The remainder of the section was in a fair condition with the exception of some low rail joints and loose bolts and a section in the neighborhood of and beyond the waterworks pumping station, which might be levelled up to advantage.

I direct that the rail joints on this line be put in proper condition and that guard rails be put in the curves near Woodland Cemetery and those near that locality known as Fairyland; also that the decayed timber over the culvert near Woodland Cemetery be renewed and ties properly packed where culverts have been filled in.

A reasonable time in which all repairs to track should be carried out, would be before June the 1st, 1907, and I direct the same accordingly.

ROADWAY.

I am of opinion that generally speaking the track allowances are not in any worse condition than that over the remainder of the streets and therefore I direct that they shall be put in repair by the Company according to the terms and conditions set forth in By-law No. 916 respecting the London Street Railway.

It is true there are some breaks in the track pavement on Dundas Street, but it is understood that repairs are about to be made. It might also be mentioned that the track could be raised to advantage on Wellington Street between James and Gosvenor Streets, and I direct accordingly that the same be raised to conform to the grade on the street.

BRIDGES.

I made an inspection of the bridges and found that they were not in a very satisfactory condition.

In reference to the Wellington Street bridge I found at the time of my inspection that a number of new stringers had been put in but the decayed ties and guard timbers had not yet been replaced, as directed by the Board in their order dated the 11th day of October, 1906.

It might be mentioned in connection with this bridge that the truss anchorage at south abutment comes closer to the edge of the abutment wall than it should. However, the masonry at this point appears to be firmly in place as far as can be seen. A photograph showing this defect is attached herewith.

I direct that guard rails with tie rods be placed in the curves approaching the bridge.

Ridout Street Bridge. Some of the stringers on Ridout Street bridge I found to be slightly decayed on top and there was a defect on the south abutment.

At this point the stringers rest on a cross timber which is supported at one end by a post set into the sloping embankment, and I direct, as a precaution that stringers be put in long enough to reach at least eight feet on to the south embankment and thus ensure a means of support for the stringers in case of the settling of the said post due to wash-out and caving in of the embankment. If the post is sound and set a sufficient depth in the ground it might be made secure by being properly braced from the bridge pier. I also direct that guard rails and tie rods be placed in the curve approaching the north end of this bridge.

Stanley Street Bridge. Some of the ties on the Stanley Street bridge are decayed as well as portions of the guard timbers and the filling at the west abutment requires attention.

I direct that these defective ties be replaced and guard timbers repaired; also that the crib work supporting the filling at west abutment be properly braced and more filling put in at this point. The track approaching the east end of this bridge is being repaired and guard rails are being put in.

Dundas Street Bridge. On the Dundas Street bridge a number of ties are badly decayed and stringers slightly decayed on top as well as the guard timbers. The rails on curve approaching the west end of the bridge are not in a satisfactory condition. The outer rails were somewhat worn and the inner were not provided with a satisfactory guard.

I direct that the defective ties and guard timbers be replaced and the cross timber carrying the stringers on the east abutment which I found

to be completely decayed; also that guard rails with tie rods be put in said curve and that rails on bridge be put in proper alignment.

I direct where new guard timbers are put in on these bridges that they be at least six by eight inches placed edgewise and well bolted; that all guard timbers smaller than this be fitted with angle iron. The outer guard timber should be extended a few feet beyond bridge at the south approach of Wellington Street bridge and west approach of Dundas Street bridge.

While the use of Girder Groove Rails on the bridges is not good practice, it is not essential that they be replaced, provided that sound ties and efficient guard timbers be put in and rails well spiked up to gauge.

Owing to the condition of the said bridges and the principle on which they have been constructed, I direct that cars passing over them be limited to a speed of not over five miles per hour.

A reasonable time in which all repairs in connection with the above said bridges be completed would be the first day of March, 1907, but that repairs to track at approaches to bridges should be made forthwith and I direct the same accordingly.

OVERHEAD WIRES.

The overhead wires on the whole were in a fair condition as far as could be seen. Some sections were apparently worn and some improvements might be made to the overhead work on the Springbank Park line and on the branch running north on Richmond Street above Regent Street by putting in flexible supports for the insulators.

I direct that the wooden poles be put up into proper position where they have been pulled over to any extent, as such poles are unsightly when they are badly out of symmetry, especially on city streets.

It is understood that the Company are replacing the worn trolley wire from time to time with new wire and that they intend to improve the overhead work on the Springbank Park line, and I make no direction for this reason.

CARS.

The cars were inspected as closely as possible and the trucks, brakes and other parts of the running gear were found on the whole to be in a fairly good state of repair.

The following table will give an idea of the rolling stock equipment at present in connection with the system:

THE LONDON STREET RAILWAY COMPANY CAR EQUIPMENT, NOVEMBER 6TH, 1906.

No. of Cars.	TYPE.	KIND OF TRUCK.	MOTORS IN EACH	Con-trollers.	Date began Service.
Five	Dbl truck open...	Can. Sw. & Spg. Co....	4 G. E. 800.....	K. 4	May 1903
Four	Dbl truck closed..	Brill 27.....	4 G. E. 800.....	K. 10	May 1903
One	Dbl truck closed..	Brill 27.....	4 G. E. 1,000.....	K. 10	May 1903
Twelve	Sgl truck closed..	Can. Sw. & Spg. Co....	2 G. E. 800.....	K. 2	1895
Twelve	Sgl truck closed..	Can. Sw. & Spg. Co....	2 G. E. 1,000.....	K. 2	1895
Five	Sgl truck closed..	McQuire Columbian...	2-92 Westinghouse..	C.-200	Aug. 1906
One	Wrecker.....	Can. Sw. & Spg. Co....	2 G. E. 800.....	K. 2	1895
One	Sweeper.....	Special.....	2 G. E. 1,200.....	K. 2	1895
One	Construction.....	Can. Swg. & Spg. Co....	2 G. E. 1,000.....	K. 2	1906
Four	Ten bench.....	Can. Swg. & Spg. Co....	None.....	None	

The five new cars put into service in 1906 are first class in every respect and it is understood that the Company intend to put more of these into service in the near future. Those equipped with double trucks are also good cars and some of these are being re-painted.

The bodies of the single truck cars which were put into service in 1895 are in bad condition as far as appearances are concerned. The veneering on the ceilings was apparently ruined by allowing the roofs to leak at some time for want of paint.

I direct that the bodies of these old cars be overhauled and re-painted or that they be replaced by new cars twelve months from the date hereof.

SANITARY CONDITION OF CARS.

The cars with centre aisles are apparently kept in a fairly clean condition but I direct that more attention be given to the sweeping out and cleaning of the old side aisle cars which were found to be in rather an uncleanly state.

FENDERS.

Two types of fenders are in use on the system. The old and the new type with which the new cars are equipped. The new fenders are similar to those in use on the Detroit railway and are substantially constructed of angle iron and steel straps. They are arranged so that they can be dropped by a foot trip conveniently located within the vestibule. The fender is held up by two chains attached to the supporting arms of the fender and attached to a horizontal shaft held by the car body. The shaft carries a ratchet which is engaged by a pawl so that the fender can be wound up to the desired height above the rail and can be dropped by disengaging said pawl. This arrangement also provides flexibility to lessen impact and the front of the car is provided with an efficient flexible protector.

I am of opinion that this fender is as efficient as most fenders on the market, provided it is kept low enough to the rails, but a still greater protection could be afforded by the addition of a wheel guard.

The old fenders are not satisfactory and I direct that they be replaced by the new fender or any of those to be adopted by the Board; I also direct that the projecting draw-bars which are carried on the front of some of the cars be removed or arranged so that they can be readily taken off or pushed to one side so that they will not come in contact with anyone who might be caught on the fender. I direct that the old fenders be replaced with new ones on or before the first day of February, 1907.

While your Board has not asked for any report as to the power generating plant, something might be said in so far as it affects the efficiency of the service.

The present equipment of the plant is barely sufficient to handle the load at busy hours with all generators in operation and there is consequently no reserve in case of break-down of one of the units. However, the Company is fully aware of the importance of providing additional power as a reserve for additional cars at busy times, and it is understood that they have decided to instal additional units in the near future. This being the case, I refrain from making any direction upon the subject of power.

CONCLUSION.

It is evident that the London Street Railway System has been gradually allowed in the past to get into a bad state of repair. It has been my design to make such directions as will place the system in a proper state of efficiency and make it safe and convenient for the public.

The length of time to be allowed for the carrying out of repairs has been recommended with due consideration of the time of year and scarcity of labor and material.

I return with this report a complete list of car routes, schedules, map and photographs which may be of use to the Board.

Respectfully submitted,

J. C. ROYCE.

Toronto, Nov. 9, 1906.

THE ONTARIO RAILWAY AND MUNICIPAL BOARD.

Before

JAMES LEITCH, Esq., K.C.,
Chairman;
A. B. INGRAM, Esq.,
Vice-Chairman, and
H. N. KITTSO, Esq.,
Member.

Saturday, the 10th day of November,
A.D. 1906.

Between the Corporation of the City of London, Applicant, and the London Street Railway Company, Respondent.

Upon reading the Report of James C. Royce, Esq., Consulting Engineer, bearing date the 9th day of November, A.D. 1906, and made in this manner pursuant to an order of the Board made on the 11th day of October, A.D. 1906.

The Board orders that the repairs, renewals, reconstruction, alterations, new works, materials and equipment of the London Street Railway mentioned, set forth and directed in the said report of the said James C. Royce, bearing date the 9th day of November, A.D. 1906, be made, done or furnished by the London Street Railway Company, the Respondents, their servants, agents or workmen, at the times and in the manner set forth in the said report.

And the Board further orders the Respondents, The London Street Railway Company, to pay forthwith to the said James C. Royce the sum of \$281.00, being his costs, charges and expenses of and incidental to his said inspection and report and the Board now makes no further order as to costs.

The Board reserves further order and directions and further question of costs until after the time fixed by the said report for making the repairs, renewals, reconstruction or alterations therein set forth.

(Sgd.) JAS. LEITCH,

Chairman of the Ontario Railway and Municipal Board.

THE ONTARIO RAILWAY AND MUNICIPAL BOARD.

Before

JAMES LEITCH, Esq., K.C.,
Chairman;
A. B. INGRAM, Esq.,
Vice-Chairman, and
H. N. KITTSO, Esq.,
Member.

Wednesday, the 31st day of October,
A.D. 1906.

In the Matter of the Application of the Brantford Street Railway Company for the approval under section 221 of "The Ontario Railway Act, 1906," of Robert O. Clark of the City of Brantford, as an Examiner of Motor-men for said Company.

Upon the application of the Brantford Street Railway Company and upon hearing what was alleged by the applicant and upon examining the said Robert O. Clark.

The Board doth order that the appointment of the said Robert O. Clark of the said City of Brantford, in the County of Brant, in the Province of Ontario, Engineer and Machinist, as an Examiner of Motormen for the said Company, be and the same is hereby approved under and in pursuance of Section 221 of "The Ontario Railway Act, 1906."

(Sgd.) JAS. LEITCH,
Chairman of the Ontario Railway and Municipal Board.

THE ONTARIO RAILWAY AND MUNICIPAL BOARD.

In the Matter of the Application of Cyril William St. Clare, of the Town of Aylmer, in the County of Elgin, Pork Packer, for an Order for the annexation of certain lands and premises owned by him, in fee simple, to the Town of Aylmer.

Before

JAMES LEITCH, ESQ., K.C.,

Chairman;

A. B. INGRAM, ESQ.,

Vice-Chairman, and

H. N. KITTSOY, ESQ.,

Member.

} The 2nd day of November,
A.D., 1906.

Upon the application of the above named Applicant, and upon the consent of the corporation of the Town of Aylmer, and upon the consent of the corporation of the Township of Malahide, and upon hearing counsel for the Applicant, and upon reading the papers filed upon the Application;

The Board orders that the application of the above named Applicant be granted, and that the lands and premises mentioned and described in the Application herein, being All and Singular that certain parcel or tract of land and premises at present situate and lying and being in the Township of Malahide, in the County of Elgin, and Province of Ontario, being more particularly known as Park Lot Number Six, being a sub-division of Lot Eighty-two North on Talbot Road East in the said Township of Malahide, according to Registered Plan Number 145 for Malahide aforesaid, containing Four acres, more or less, be and the same are hereby annexed to the corporation of the Town of Aylmer, in the said County of Elgin, from and after the First day of January, A.D. 1907.

(Sgd.) JAS. LEITCH,
Chairman of the Ontario Railway and Municipal Board.

 THE ONTARIO RAILWAY AND MUNICIPAL BOARD.

Before

JAMES LEITCH, Esq., K.C.,
 Chairman:
 A. B. INGRAM, Esq.,
 Vice-Chairman, and
 H. N. KITTSON, Esq.,
 Member.

} Monday, the 3rd day of December,
 A.D. 1906.

In the Matter of the Application of the International Transit Company for the sanction of its by-laws, rules and regulations.

Upon the Application of the International Transit Company, and upon reading the certified copy of the by-laws of the said Company hereto annexed and the copy of the rules and regulations of the said Company hereto annexed:

The Board orders that the said by-laws, rules and regulations of the said Company be and the same, are hereby sanctioned and approved.

(Sgd.) JAS. LEITCH,
 Chairman of the Ontario Railway and Municipal Board.

 THE ONTARIO RAILWAY AND MUNICIPAL BOARD.

Before

JAS. LEITCH, Esq., K.C.,
 Chairman:
 A. B. INGRAM, Esq.,
 Vice-Chairman, and
 H. N. KITTSON, Esq.,
 Member.

} Wednesday, the Fifth day of December,
 A.D. 1906.

In the Matter of the Application of the Butler Brothers Hoff Company, of Windsor, in the County of Essex, for an Order for a crossing of the line of the Sandwich, Windsor and Amherstburg Railway by the applicant Company's construction railway on London Street, in the City of Windsor.

Upon the Application of the above named applicant, upon reading the application to the Council of the Corporation of the City of Windsor, herein, the resolution of the Council of the said Corporation passed on the 5th day of December, 1906, and upon reading the agreement between the Sandwich, Windsor and Amherstburg Railway and the above named applicant:

The Board orders that the Butler Brothers Hoff Company be permitted to construct a light railway as shown on the plan filed on this application crossing London Street, in the City of Windsor, in the County of Essex, immediately West of the Michigan Central Railway Company's right of way, which light railway is to be used in connection with the construction of the tunnel under the Detroit River.

(Sgd.) JAS. LEITCH,
 Chairman of the Ontario Railway and Municipal Board.

THE ONTARIO RAILWAY AND MUNICIPAL BOARD.

Before

JAS. LEITCH, Esq., K.C.,

Chairman;

A. B. INGRAM, Esq.,

Vice-Chairman, and

H. N. KITTSON, Esq.,

Member.

Monday, the Tenth day of December,
A.D. 1906.

Between the Canadian Pacific Railway Company, Applicants, and the Municipal Corporation of the Town of Galt, Respondents.

The application of the Canadian Pacific Railway Company, by way of Appeal from the decision of the Court of Revision of the Town of Galt, coming on for hearing before the Board this day, pursuant to appointment, in the presence of Counsel for both parties: upon hearing what was alleged by Counsel for the Applicants and Respondents, herein, and it appearing from the statements of Counsel for both parties that the said appeal was in respect of \$20,000, being the assessment of the Applicant's bridge over the Grand River, and in respect of \$1,500, being a business assessment against the Applicants in the Town of Galt:

The Board orders that the Applicant's appeal in respect of the sum of \$20,000, the assessment against the Applicant's bridge over and being upon part of a highway in the Town of Galt, and the business assessment against the Applicants of \$1,500, be and the same is hereby allowed.

And it is further ordered in pursuance of the consent of Counsel for both parties that the assessment of all other property of the Applicants in the Town of Galt liable for assessment, be and the same is hereby fixed at the sum of \$20,000, and the Board makes no order as to costs.

(Sgd.) JAS. LEITCH,
Chairman of the Ontario Railway and Municipal Board.

THE ONTARIO RAILWAY AND MUNICIPAL BOARD.

Before

JAMES LEITCH, Esq., K. C.,

Chairman;

A. B. INGRAM, Esq.,

Vice-Chairman, and

H. N. KITTSON, Esq.,

Member.

Monday, the tenth day of December,
A.D. 1906.

In the Matter of the Application of Margaret Fry Baldwin and Henry St. George Baldwin, executors and trustees of the will of William Augustus Baldwin, Esq., late of Mashquatch, deceased, and others, for the annexation to the City of Toronto of certain lands in the Township of York.

Upon the application of the above named applicants and upon reading the resolution of the Council of the Municipal Corporation of the City of Toronto passed on the 26th day of November, A.D. 1906, the petition of the said applicants, the affidavit of John T. Small, solicitor for the applicants, and copy of Plan 1324 (County of York) filed and upon hearing what was alleged on behalf of the applicants,

The Board orders and proclaims that the lands and premises in the Township of York mentioned and described in the said petition being:

(1) The lands, lots, blocks, highways, roads and streets in the said Township of York shown on Plan Number 1324, registered in the registry office for the County of York; (2) all that part of Parcel Number Two on Plan 315, registered in the registry office for the County of York, lying south and west of Russell Hill Road, as shown on said Plan 1324, which may be described as follows:—Commencing at a point where the southerly boundary of Lot 60 on said Plan 1324 intersects the westerly limit of Russell Hill Road; thence southerly and easterly following the line of Russell Hill Road to its intersection with a fence forming the southerly boundary of said Parcel Two; thence south eighty-four degrees thirty-two minutes west along said fence, two hundred and forty-three feet six inches; thence north eighty-one degrees forty minutes west along a fence line, seven hundred and forty-six feet to the fence forming the westerly boundary of the Baldwin Estate; thence north eleven degrees forty-six minutes west following the said last mentioned fence to the intersection of the production westerly of the southerly limit of Lot 60 aforesaid with said fence; thence north seventy-four degrees eleven minutes east along said production and along said boundary of Lot 60, in all one hundred and fifty-nine feet more or less to the point of commencement.

Be and the same are hereby annexed to the City of Toronto, such annexation to take effect on the first day of January, A.D. 1907, upon and subject to the following terms and conditions, namely:

"1. There shall be no special terms as to taxation, assessment or improvements except as hereinafter mentioned.

"2. The said addition or annexation shall take effect on the 1st day of January, 1907.

"3. The lands annexed shall be added to Ward No. 4 of the City of Toronto.

"4. The taxes and rates imposed for the year 1906 or any prior year upon any of the said lands which have not yet been collected shall be collected by and belong to the Township of York.

"5. The said City of Toronto may at any time prior to the passing of a by-law striking the rate of taxation for the year 1907, assess (subject to the rights of appeal provided by the Assessment Act) the lands included in the said territory, and the owners and occupants thereof, for the year 1907 as though the said assessment had been made in the year 1906, and the assessment so made shall be the assessment on which the taxes in the said territory for 1907 shall be collected."

JAMES LEITCH,

Chairman of the Ontario Railway and Municipal Board.

THE ONTARIO RAILWAY AND MUNICIPAL BOARD.

Before

JAMES LEITCH, Esq., K.C.,

Chairman;

A. B. INGRAM, Esq.,

Vice-Chairman.

The eleventh day of December,
A.D. 1906.

Between the Corporation of the City of Ottawa, Applicant, and the Ottawa Electric Company, Respondent.

Upon the application of the above named applicant for an order approving of a by-law to authorize the issue of debentures of the said corporation

to the amount of \$50,000 to provide for the cost of extensions and improvements of the municipal electric light works, and the payment of the expense of extensions and improvements thereof already made and completed, in the presence of the applicant and respondent, upon hearing the evidence adduced on behalf of the applicant and respondent and upon hearing counsel for the applicant and respondent,—

The Board orders that the said by-law of the Corporation of the City of Ottawa to authorize the issue of debentures of said corporation to the amount of \$50,000 to provide for the cost of extending and improving the municipal electric light works of the said corporation, and the payment of the expense of extensions and improvements thereof already made and completed, read the first time on the 7th day of August, 1906, and read the second time on the 20th day of August, 1906, be and the same is hereby approved.

JAMES LEITCH,
Chairman of the Ontario Railway and Municipal Board.

MEMORANDUM OF AGREEMENT made and entered into this sixth day of December, A.D. 1906, between the Hamilton Radial Electric Railway Company, hereinafter for convenience sake called the "Company," party of the first part, and Division 107 of the Amalgamated Association of Street and Electrical Railway Employees of America, Hamilton, Ontario, hereinafter for convenience sake called the "Association," party of the second part.

Witnesseth: That in the operation of the lines of the Company both parties hereunto mutually agree as follows:—

Section 1. The Company, through its properly accredited officers, agrees to treat with the duly authorized members of the Committee of the Association, who are in the employ of the Company, upon all questions or grievances affecting the interests of the men in the Company's employment who are members of the Association, which from time to time may arise between them.

Section 2. The Company agrees not to discriminate against any of their employees for becoming members of the Association and will not prevent any of their employees from becoming members of the same.

Section 3. Any and all differences or disputes arising between the Company and the employees who are members of the Association shall be submitted through the properly accredited Committee of the Association to the Traction Manager of the Company in writing, and if they cannot agree, the President or General Manager may be called into conference.

Section 4. The Company agrees that the scale of wages of the motormen and conductors shall be as at present, namely: 14 cents per hour for the first year's service, 15 cents per hour for the second year, 16 cents per hour for the third year, and 17 cents per hour for the fourth year and thereafter, and two cents per hour for extra work done over schedule time and upon Sundays.

Section 5. Motormen and conductors who have been continuously in the Company's employ for a period of six months prior to the letting of the contract for uniforms to be supplied with a uniform suit upon the following conditions: *First*, it is understood and agreed that the Division, if they so

desire, shall have the right to purchase uniforms in the open market, but the style, color and finish are to be subject to the Company's approval, and the Company agrees to pay one-half the cost of uniforms for all men who have been in the employ of the Company six months prior to the letting of said contract. *Second*, it is further understood and agreed that in case any employee leaves the service of the Company within one month after receiving his uniform, the Company may retain from his wages the said one-half cost of his uniform, and any employee leaving the service of the Company within three months of the time of receiving his uniform the Company may retain from his wages one-quarter of the cost of said uniform.

Section 6. Any employee or Committee of the Company's employees properly authorized to represent the employees and whose duty in such capacity requires their absence from the Company's service, such absence shall be granted at reasonable times, having regard to the Company's service, and for acting in such capacity they shall not in any way prejudice their position in the Company's service.

Section 7. Conductors to be supplied by the Company with a sufficient quantity of tickets to run their cars, providing the said conductors pay to the Company one-half of the cost of a guarantee bond covering the amount of tickets furnished.

Section 8. In the case of a breakage or other damage to cars while in the custody of employees, they will be liable only for such breakages or damages as have been caused by their negligence or carelessness, any payment in respect of damage so caused to be not greater than one-half the actual cost of the repairs.

Section 9. This agreement and all the provisions contained therein shall remain in force and be binding on the respective parties until the 1st day of April, 1909.

In witness whereof the parties hereto have hereunto set their hands the day and year first above written.

Signed in the presence of

(Sgd.) Wm. C. Coe.

Hamilton Radial Ry. Co.,

(Sgd.) C. K. GREEN, Mgr.

(Sgd.) JOHN THEAKER,

President of Division 107 of the Amalgamated Association of Street and Electric Railway Employees of America, Hamilton, Ont.

MEMORANDUM OF AGREEMENT made and entered into this sixth day of December, A.D. 1906, between the Hamilton and Dundas Street Railway Company, hereinafter called, for convenience sake, the "Company," party of the first part, and Division 107 of the Amalgamated Association of Street and Electrical Railway Employees of America, Hamilton, Ontario, hereinafter called, for convenience sake, the "Association," party of the second part.

Witnesseth: That in the operation of the lines of the Company both parties hereunto mutually agree as follows:—

Section 1. The Company agrees, through its properly accredited officers, to treat with the duly authorized members of the Committee of the Association, who are in the employment of the Company, upon all questions and grievances affecting the interests of the men in the Company's employment who are members of the Association, which may arise between them.

Section 2. The Company agrees not to discriminate against any of their employees for becoming members of the Association and will not prevent any of the employees from becoming members of the same.

Section 3. Any and all differences or disputes arising between the Company and their employees who are members of the Association shall be submitted through the properly accredited Committee of the Association to the Traction Manager of the Company in writing, and if they cannot agree, the President or General Manager may be called into conference.

Section 4. The Company agrees that the scale of wages for motormen and conductors shall be as at present, namely: 14 cents per hour for the first year's service, 16 cents per hour for the second year, and 18½ cents per hour for the third year and thereafter, and for extra work over schedule time and on Sundays, two cents per hour.

Section 5. Motormen and conductors who have been continuously in the Company's employ for a period of six months prior to the letting of the contract for uniforms to be supplied with a uniform suit upon the following conditions: *First*, it is understood and agreed that the Division, if they so desire, shall have the right to purchase uniforms in the open market, but the style, color and finish are to be subject to the Company's approval, and the Company agrees to pay one-half the cost of uniforms for all men who have been in the employ of the Company six months prior to the letting of said contract. *Second*, it is further understood and agreed that in case any employee leaves the service of the Company within one month after receiving his uniform, the Company may retain from his wages the said one-half cost of his uniform, and any employee leaving the service of the Company within three months of the time of receiving his uniform, the Company may retain from his wages one-quarter of the cost of said uniform.

Section 6. Any employee or Committee of the Company's employees properly authorized to represent the employees and whose duty in such capacity requires their absence from the Company's service, such absence shall be granted at reasonable times having regard to the Company's service, and for acting in such capacity they shall not in any way prejudice their position in the Company's service.

Section 8. Conductors to be supplied by the Company with a sufficient quantity of tickets to run their cars, providing the said conductors pay to the Company one-half of the cost of a guarantee bond covering the amount of tickets furnished.

Section 9. In the case of a breakage or other damage to cars while in the custody of employees, they will be liable only for such breakages or damages as have been caused by their negligence or carelessness, any payment in respect of damage so caused to be not greater than one-half the actual cost of the repairs.

Section 10. This agreement and all the provisions contained therein shall remain in force and be binding on the respective parties until the 1st day of April, 1909.

In witness whereof the parties hereto have hereunto set their hands the day and year first above written.

Signed in presence of

(Sgd.) Wm. C. Coe.

Hamilton & Dundas St. Ry. Co.,

(Sgd.) C. H. GREEN, Mgr.

(Sgd.) JOHN THEAKER,

President Division 107 of the Amalgamated
Association of Street & Electric Rail-
way Employees of America, Hamilton,
Ontario.

MEMORANDUM OF AGREEMENT made and entered into this sixth day of December, A.D. 1906, between the Hamilton Street Railway Company, hereinafter, for convenience sake, called the "Company," party of the first part, and the Amalgamated Association of Street and Electrical Railway Employees of America, Division 107, of Hamilton, Ontario, hereinafter, for convenience sake, called the "Association," party of the second part.

Witnesseth: That in the operation of the lines of the party of the first part both parties hereunto mutually agree as follows:

Section 1. That the Company, through its properly accredited officers, will continue to treat with its employees, who are members of the Association, through the properly accredited officers and committees of said Association.

Section 2. That during the continuance of this agreement the wage scale shall be as follows: Motormen and conductors shall be paid for the first year's service at the rate of 16 cents per hour, for the second year 18 cents per hour, and after the second year's service they shall be paid 20 cents per hour. Machinists, blacksmiths and linemen shall be paid 20 cents per hour. Shopmen shall be paid at the rate of 15 cents per hour for the first year's service, 16 cents per hour for the second year, 17 cents per hour for the third year, and 18 cents per hour thereafter. Carpenters, painters, armature winders, blacksmiths' helpers, trackmen and watchmen to be paid the same rate of wages as at present.

Section 3. All extra motormen and conductors who report at car barns and relief changes shall be guaranteed a minimum wage by the Company of \$6.00 per week, but should an extra motorman or conductor fail to report at any time during the week, then the Company will not be required to guarantee the \$6.00 per week.

Section 4. For all work performed by motormen, conductors, linemen, shopmen, machinists and blacksmiths over schedule time, and for all work performed on Sundays, they shall be paid at the rate of 2 cents per hour extra.

Section 5. All work for extra men shall be divided, as near as practicable, equally among them.

Section 6. In order to establish a work day for motormen and conductors that will meet the Deering and other tripper conditions that prevail on the system or may arise from time to time in the future, there shall be estab-

lished: First—The priority system of dealing out runs; each motorman and conductor to hold his promotion in accordance with his continuous age in the service, they to have the right to select their runs in accordance with their age in the service of the Company. All runs to be posted for motormen and conductors to make their selection as to the run they may desire at least once in each three months commencing with the first of January in each year.

Should there be a vacancy between the periods of selection, the men below such vacancies shall have the right to move up in accordance with their age in the service on the first of each month.

Second—All runs shall be scheduled and divided in such manner as to give as many regular day runs as possible of ten hours each, to be completed inside of twelve consecutive hours, with a lee way of a half trip to complete schedule.

Third—As many runs as possible shall be scheduled and divided into runs to be known as late regular runs of ten and one-half hours work day, to be completed inside of twelve and one-half consecutive hours, with a lee way of fifteen minutes to complete the schedule.

Fourth—The balance of the runs to be known as swing and mixed runs and to be scheduled in the shortest number of hours possible to arrange them. The swing runs to be a twelve-hour work day and to have at least one day off each week. The mixed runs to be at least a ten-hour work day. That whenever the organization, through their committees, can show to the Company that a greater percentage of the runs can be advanced from swing and mixed runs, to regular early and late runs, as specified above, the change giving the same service desired by the Company, they shall have the right to do so, and on the presentation of these changes to the Company the same will be adopted by them and put into effect.

Section 7. In cases where the employees are required by the Company to secure evidence in connection with accidents, collisions, or for any other cause, or are taken off duty by the Company to give evidence in legal or other matters, said employees shall be paid for the loss of such time at the same pay they would have received had they been working at their regular employment.

Section 8. Conductors to be supplied by the Company with a sufficient quantity of tickets to run their cars providing the said conductor pays to the Company one-half of the cost of a guarantee bond covering the amount of tickets furnished.

Section 9. Any member elected or appointed to an office in the Association shall be permitted to serve in such official capacity without prejudice to his service or line of promotion in the employment of the Company. If a shopman is elected or appointed to office in the Association he shall not act except when questions of interest to the shopmen are concerned.

Section 10. In case any member of the Association is suspended or discharged for any cause whatsoever, the Company, through its Manager, upon request in writing, shall grant an interview to the Grievance Committee and if, upon investigation, it is found by the Manager that the man is not at fault, he shall be reinstated in his former position and paid for all time lost, in the discretion of the President, to whom the matter can be referred.

Section 11. All differences between the Company and the Association shall be adjusted as follows:—

First: Any and all differences or disputes arising between them shall be submitted through the properly accredited committees of the Association to the Traction Manager of the Company, in writing, and if they cannot agree the President or General Manager may be called into conference.

Section 12. Every motorman and conductor who has been continuously in the Company's employ for a period of six months prior to the letting of the contract for uniforms, shall be supplied with a uniform suit upon the following conditions:

(a) It is understood and agreed that the Association, if they so desire, shall have the right to purchase uniforms in the open market, but the style and color and finish are to be subject to the Company's approval, and the Company agrees to pay one-half the cost of uniforms for all men who have been in the employ of the Company six months prior to the letting of said contract.

(b) It is further agreed that in case any employee leaves the service of the Company within one month after receiving his uniform, the Company retains from his wages the said one-half cost of his uniform, and any employee leaving the service of the Company within three months of the time of receiving his uniform, the Company may retain from his wages one-quarter of the cost of said uniform.

Section 13. The Company will fit all ten bench open cars with eaves on both sides, the said work to be done before the cars are put in service for the season of 1907.

Section 14. In case of a breakage or other damage to cars while in the custody of employees, they will be liable only for such breakages or damages as have been caused by their negligence or their carelessness, any payment in respect of damage so caused to be not greater than half the actual cost of the repairs thereof.

Section 15. This agreement and all provisions contained therein shall remain in force and be binding on the respective parties until the 1st day of April, 1909.

In witness whereof the parties hereto have hereunto set their hands the day and year first above written.

Signed in the presence of

(Sgd.) Wm. C. Coe.

Hamilton Street Railway,

(Sgd.) C. K. GREEN, Mgr

(Sgd.) JOHN THEAKER,

President Division 107 of the Amalgamated
Association of Street and Electric Rail-
way Employees of America, Hamilton,
Ontario.

We hereby agree to refer all matters in dispute between us to the Ontario Railway and Municipal Board, unconditionally.

Dated 28th of November, 1906.

Witness:

T. J. STUART.

(Sgd.) The Hamilton Street Ry. Co.,
C. K. GREEN, Mgr.

(Sgd.) The Hamilton Radial Ry. Co.,
C. K. GREEN, Mgr.

(Sgd.) The Hamilton & Dundas St. Ry.,
C. K. GREEN, Mgr.

Signed for Division 107,
JOHN THEAKER, Pres.

To all, to whom these presents shall come.

The Ontario Railway and Municipal Board send greeting.

Whereas a certain agreement of reference, dated the 28th day of November, A.D. 1906, was made between the Hamilton Street Railway Company, the Hamilton Radial Company, and the Hamilton and Dundas Street Railway Company, and the Amalgamated Association of Street and Electrical Railway Employees of America, division 107, Hamilton, Ontario, in the following words:

"We hereby agree to refer all matters and disputes between us to the Ontario Railway and Municipal Board unconditionally.

And whereas the said Ontario Railway and Municipal Board having taken upon themselves the burden of the said reference, and having duly weighed and considered the several allegations of the parties, and also the proofs, vouchers and documents which have been brought before the Board, and having heard what was alleged by the representatives of all parties.

The Board on the 30th day of November, 1906, awarded, adjudged and directed as follows:

"The Board, in order to serve the comfort, convenience and best interests of all classes of the community, hereby orders the strike off, and orders and directs all the men now out on strike to return to their respective employment, and also orders and directs the companies to receive the men back, and the companies are forthwith to put a complete service in operation.

The Board further awards, adjudges and directs said parties to sign and execute the agreements, copies of which are hereto annexed.

The Board further awards that each of the said parties should pay his own costs of this reference. In witness whereof the Chairman of the Board has hereunto set his hand and affixed the seal of the Board, the 6th day of December, A.D. 1906.

Signed, sealed and published,
in the presence of

(Sgd.) H. SMALL.

(Sgd.) JAMES LEITCH,
Chairman of the Ontario Railway and
Municipal Board.

ONTARIO RAILWAY AND MUNICIPAL BOARD.

IN THE MATTER OF THE HAMILTON STRIKE.

In making their formal award, the Board think that it is desirable, for the information of the parties interested, to state the grounds upon which their findings have been made.

The first difficulty between the Board and the men arose in the month of August last. After considerable negotiation between the officers of the Company and the representative of the men, it was agreed to submit their difference to arbitration. The Company appointed one arbitrator, the men another, and it was some weeks before the two arbitrators thus appointed succeeded in agreeing upon a third arbitrator.

The arbitrators thus appointed made their award in September, and on the 20th day of October, the parties executed an agreement in accordance with the terms of the award.

After the agreement made in pursuance of the award was executed, it was found that it was impracticable, and that it worked an injustice to the first year men, in that, while it apparently gave them 16 cents per hour, it only enabled them to earn \$1.28 per day. This created a great deal of dissension between the men and the Company, which ultimately resulted in the men going on strike. The Company has alleged in the most confident terms, and has strongly urged the Board to report that they were in no sense to blame for the unfortunate strike, and the unhappy state of affairs that has distracted the city. The Board think no good purpose would be served by making any finding as to who was to blame. Neither is it necessary to go into the details of the riots, violence destruction of property, assaults and breach of the peace, order and good government of the city that happened from shortly after the time the strike commenced; let the dead past bury its dead.

On the 28th day of November last, the Hamilton Street Railway, the Hamilton Radial Railway, the Hamilton and Dundas Railway, and the Amalgamated Association of Street Railway Employees, division No. 107, of the City of Hamilton, agreed to refer all matters in dispute between them to the Board unconditionally.

As you are aware the first thing the Board did was to declare the strike off, and to order the men back to their employment, and the Company to receive them, and to forthwith operate a complete service. After taking a short time to consider the situation, the Company undertook to carry out this order as far as they possibly and reasonably could, and the men reported for work the next morning.

After this both parties asked for time to have a conference in order that they might, if possible, agree upon as many questions in dispute as they possibly could, and anything that could not be agreed upon, the Board were to deal with. As the result of conferences with one another, and with the Board, the Company and the men practically agreed upon everything, except the rate of wages, suspensions, arbitration and time of duration of the award.

The form of carrying out the determination of the Board, which was suggested by Mr. Mahon, representing the men, is that of agreements, a draft of which was submitted and which the Board has settled, and which by our award we direct the parties to execute.

The men, in the draft agreement put forward by Mr. Mahon, ask for a very considerable increase of wages over and above what existed at the

time of the strike, under the award, which was found impracticable to work out.

The Board have not seen their way clear to increase the rate of wages beyond what was fixed by the agreement signed by the Company, and representative of the men pursuant to the award of the arbitrators, and which was approved of by the men in a written memorandum, bearing date the 30th day of October last, which reads as follows:—

“AMALGAMATED ASSOCIATION OF STREET AND ELECTRIC
RAILWAY EMPLOYEES OF AMERICA.

Hamilton, Ontario, Oct. 30th, 1906.

“C. K. GREEN,
Traction Manager, Hamilton Street Ry., City.

“Dear Sir,—We beg to inform you that, at a special meeting of the members of division No. 107 (your employes) held Saturday night, the 27th inst., a resolution was unanimously adopted, in which approval of the new agreement with the the arbitrators' award contained therein was expressed, and said resolution instructs us to notify you that it is the desire of our membership that you put the new schedule in force over all the lines on the street railway by Thursday of this week.

“Trusting that you may be able to comply with this request without inconvenience to yourself.

We remain,
Yours sincerely,

(Sgd.) A. LAMOND
Secretary.

(Sgd.) JOHN THEAKER,
President.”

It is proper that the Board should clearly explain the reasons why they have not increased the rate of wages. Not only should the Board do justice to both parties, but they should endeavor to make the parties feel that justice has been done. The Board have endeavored to decide the question of wages upon principle and not as a matter of compromise. We think that is the proper course to pursue; because both parties are apt to be extreme in the demands they put forward, expecting that the difference may be split. The Board are of the opinion that splitting the difference is not the proper principle to adopt in fixing the rate of wages. They think that if the evidence, the local conditions and circumstances make it appear that the men are entitled to an increase of wages, an order should be made without hesitation. On the contrary, if under all the circumstances, the Company are unable to pay a higher rate of wages, it should be fearlessly so stated by the Board.

The Board in this case are of the opinion that the Company are paying all that they are able to pay for the following reasons:—the Company have 21 miles of track; the bonded indebtedness of the Company is five hundred thousand dollars, which bears interest at 5 per cent.; the stock issue is two hundred and five thousand dollars, upon which no dividend has been paid for some years. The Company pay to the City 8 per cent. on the gross earnings of the road, four hundred dollars for each mile of single track. The ordinary city taxes, and they have to provide the labor necessary for the

repair and maintenance of the streets upon which the railway runs, between the tracks, and for twenty-four inches on the outside of the tracks. The Company are under an agreement with the city to sell to workmen at certain hours of the day eight tickets for 25 cents. The city contends that the word workmen includes all citizens. The question as to the construction of this part of the agreement is still before the courts, but so far, the decisions have been adverse to the Company. The result of this is to depreciate the earnings of the Company, and to cause a greater congestion of their traffic at the very hours of the day when the traffic is ordinarily most congested.

The city and a large number of the citizens have made an application to the Board to compel the Company to put their tracks, rolling stock and general equipment in a better state of repair, and to give them more up to date cars and service. This application is still pending before the Board.

In view of the financial position of the Company as above outlined, the Board, feel that under the circumstances they could not increase the wages of the men above that awarded by the former arbitration, except that the agreement which the Board directs the parties to execute is so worded that the men can earn the maximum of \$1.60, \$1.80 and \$2.00 per day, which they were unable to do in the 16 cent class, under the former award. Under the present award, the new men can earn \$1.60 per day, whereas under the old award they could only earn \$1.28, making an increase of 32 cents per day to the men in the 16 cent class.

Another reason which operated in the mind of the Board is that the wages fixed by the Board, compared favorably with the wages paid by other railways operating in other cities in Canada, which pay large dividends on their stock, and which has a ready sale on the stock exchange. In the face of this how, it may be asked, could the Board increase the rate of wages

In reference to the duration of the award, the Board are of the opinion that it should extend to the first day of April, 1909. The men ask that it should only extend to the first of April, 1907, and the Company urge that it should extend to the first of April, 1910. The Board think that the time suggested by the men is too short. The public interest demands that this matter should remain closed for a reasonable time, and that peace and harmony should prevail. This cannot be brought about unless there is some fixity in the relation of the parties. For reasons that must be obvious to the men, and that are not further necessary to dwell upon, the Board are of opinion that the first of April, 1909, the time fixed by the former award, would be a reasonable time for the agreement to remain in force.

In reference to taking the men back, the Board are of the opinion that the Company have acted reasonably and in a proper spirit. The only difficulty seems to be in reference to the two men, William Orr, and Alexander Anderson.

In reference to Orr, the Board expects no trouble will arise for reason that Mr. Millar has stated that Orr would get work at his former employment of washing cars as soon as it could be provided. It is asserted that Anderson's conduct of using grossly insulting and abusive language was such that no Company could tolerate. Anderson denies this. We would recommend the Company to reconsider his dismissal.

The Board were very much pleased during the proceedings, with the kindly references that were made by Colonel Gibson as to the men. We have no doubt, as stated by Mr. Mahon, that this feeling will be reciprocated.

The Board desire to express their appreciation of the courtesy, and good temper shown by Colonel Gibson and Mr. Mahon to the Board, and to one

another, and also to congratulate both gentlemen on the very able way in which they conducted their respective cases under very trying circumstances and conditions.

December 6, 1906.

THE ONTARIO RAILWAY AND MUNICIPAL BOARD.

Before:—

JAMES LEITCH, Esq., K.C.,
Chairman, and
ANDREW B. INGRAM, Esq.,
Vice-Chairman.

Saturday, the fifteenth day of
December, A.D. 1906.

\$5.00 L. S.

Upon the application of the Corporation of the Town of Port Arthur, for the approval by this Board of their by-law No. 870, passed on the ninth day of November, 1906, intituled "A by-law to authorise the issue of debentures to the amount of \$50,000.00, to pay for the extension of the waterworks system of the Town of Port Arthur;" and it being shown to the satisfaction of this Board that the extensions mentioned in the said by-law are necessary, and that a sufficient additional revenue will be derived therefrom to meet the special rate required to pay the debt created by the said by-law and interest, and that three-fourths of all the members of the Council of the said town voted in favor of the said by-law.

It is ordered that the said by-law be, and the same hereby is approved.

(Sgd.) JAMES LEITCH,
Chairman of the Ontario Railway and Municipal Board.

THE ONTARIO RAILWAY AND MUNICIPAL BOARD.

Before:—

JAMES LEITCH, Esq., K.C.,
Chairman.
A. B. INGRAM, Esq.,
Vice-Chairman, and
H. N. KITTSON, Esq.,
Member.

Wednesday, the 19th day of December,
A.D. 1906.

In the matter of the application of the Sandwich, Windsor and Amherstburg Railway, for the approval under section 221 of "The Ontario Railway Act, 1906," of George McLeod, as an examiner of motormen for said Company.

Upon the application of the Sandwich, Windsor and Amherstburg Railway, and upon hearing what was alleged by the applicant, and upon examining the said George McLeod.

The Board doth order that the appointment of the said George McLeod, of the City of Windsor, in the County of Essex, Car Barn Foreman, as an examiner of motormen for the said railway be, and the same is hereby approved under, and in pursuance of section 221 of "The Ontario Railway Act, 1906."

(Sgd.) JAMES LEITCH,
Chairman of the Ontario Railway and Municipal Board.

THE ONTARIO RAILWAY AND MUNICIPAL BOARD.

Before:—

JAMES LEITCH, Esq., K.C.,

Chairman.

A. B. INGRAM, Esq.,

Vice-Chairman.

H. N. KITTSON, Esq.,

Saturday, the 29th day of December,
A.D. 1906.

In the matter of by-law number 435, of the Corporation of the Town of Fort William, entitled "A by-law to stop up and close a portion of a certain road allowance, highway chain, reserve or street in the Town of Fort William, known as Water Street, and for conveying the same to the parties herein referred to."

And in the matter of the application of the Corporation of the Town of Fort William, for an order approving of, and confirming the said by-law.

Upon the application of the Corporation of the Town of Fort William, for an order approving of, and confirming the by-law of the said Corporation, numbered 435, and entitled "A by-law to stop up and close a portion of a certain road allowance, highway chain, reserve or street in the Town of Fort William, known as Water Street, and for conveying the same to the parties herein referred to." Upon reading the petition of the said Corporation, and the declaration of Edward Saunders Rutledge, the Mayor and Alexander McNaughton, the clerk of the said corporation, and the exhibits therein referred to, and upon hearing counsel for the said corporation.

The Board orders and proclaims that the said by-law be, and the same is hereby approved of and confirmed.

(Sgd.) JAMES LEITCH,

Chairman of the Ontario Railway and Municipal Board.

THE ONTARIO RAILWAY AND MUNICIPAL BOARD.

The Niagara Falls Suspension Bridge Company, applicants, and The Municipal Corporation of the Town of Niagara Falls, respondents.

This is an application of the Niagara Falls Suspension Bridge Company by way of appeal from a judgment of the Court of Revision, of the Town of Niagara Falls, dismissing an appeal by the Company against their assessment on their bridge over the Niagara River.

The bridge, which is the subject of this appeal, is an international bridge across the Niagara River. Half of the structure is within Ontario. It is owned by the appellants, the Bridge Company, and the Ontario end of the Bridge is built on the Company's land. It is not a structure on railway lands, used exclusively for railway purposes. It is true that the Bridge Company have leased the upper part of the bridge to the G. T. Ry. The lower floor of the bridge is used for foot passengers, and for vehicular traffic and the Bridge Company collect the tolls for such user. The only witnesses, as to value, are Mr. Buck, the Engineer, who constructed the bridge, and Mr. McCullough, the Asst. Engineer of construction. The original cost of the whole bridge was \$343,579. From 10 per cent. to 20 per cent. of this outlay was incurred in maintaining the traffic over the bridge during con-

struction. Mr. Buck puts the cash value of the whole bridge, keeping in view the basis of valuation prescribed by section 43 of the Assessment Act at from \$250,000 to \$300,000. Mr. McCullough puts it at \$270,000 on the same basis of valuation. The Board are of opinion that the fair value for the Ontario half of the bridge is \$135,000, which the Board fixes as the assessment of the bridge. The assessor and Court of Revision may well be excused, under the circumstances, for not being quite accurate, and the Board think that the respondents should not be penalized in costs, and accordingly makes no order as to costs.

Board Room, 9th January, 1907.

THE ONTARIO RAILWAY AND MUNICIPAL BOARD.

Before :—

JAMES LEITCH, Esq., K. C.,

Chairman.

A. B. INGRAM, Esq.,

Vice-Chairman, and

H. N. KITTSON, Esq.,

Member.

The Ninth day of January,
A.D. 1907.

Between :—

The Niagara Falls Suspension Bridge Company, applicants, and The Municipal Corporation of the City of Niagara Falls, respondents.

Upon the application of the above named applicants, upon hearing the evidence adduced on behalf of the applicants and respondents, and upon hearing counsel for the applicants and respondents on the eighth day of January, instant, and judgment being reserved until this day.

This Board orders that the appeal of the said applicants from the decision of the Court of Revision of the said respondents be allowed, and that the assessment of the property of the above named applicants made in the year 1906, for the taxes for the year 1907, be reduced to the sum of one hundred and thirty-five thousand dollars, and that the said assessment roll be amended accordingly.

This Board further orders that each of the said parties hereto shall bear, and pay its own costs in connection with this appeal.

(Sgd.) JAMES LEITCH,
Chairman of the Ontario Railway and Municipal Board.

TORONTO, CAN., Sept. 24th, 1906.

SUBJECT: SOUTH WESTERN TRACTION CO.

H. C. SMALL, Esq., Secretary,

The Ontario Railway & Municipal Board,

Parliament Buildings,

Toronto, Ontario.

DEAR SIR,—Pursuant to the instructions issued on the 20th ultimo, by Mr. A. B. Ingram, Vice-Chairman of your Board, the undersigned has inspected the railway and equipment of the South Western Traction Co., and begs to report herewith.

The purpose of the inspection was to ascertain whether this road is in safe condition for passenger traffic, and also whether the requirements as set forth in "The Ontario Railway Act, 1906," have been complied with.

MAP.

For convenience of reference find attached hereto a route map of the railway, drawn to a scale of four miles to the inch.

SURVEYS AND PLANS.

No surveys and levels of the completed road have as yet been made, hence accurate plan and profile drawings are not available to the undersigned.

ROUTE.

That section of the road which is now in operation connects the City of London with the City of St. Thomas, the line passing through the Township of Westminster in the County of Middlesex, and through the Township of Southwold in the County of Elgin. The line runs through the Villages of Lambeth, Tempo and Talbotville.

A portion of the line now under construction extends from the City of St. Thomas to the Village of Port Stanley. This part of the line has not as yet been opened for traffic, but it is expected that it will be so opened on or before the 30th inst.

This report will apply only to that section of the line which has been opened for traffic, namely, between London and St. Thomas, a distance of eighteen and a half (18½) miles.

RIGHT-OF-WAY.

This road is built on its private right-of-way, from the Base Line Road, outside the London City limits, through to Horton Street. The terminal station in the City of London is within a block and a half of the Grand Trunk Railway depot. See Figure 1, showing a view of the London terminal.

On leaving the city limits of London, the road is carried across the Thames River on a steel through bridge built by the Hamilton Bridge Works Co., Ltd., according to the Dominion Government standard specifications and capable of carrying the heaviest cars and locomotive at present in use on steam roads in this Province. It is supported at the north end by a concrete abutment and at the south end by a concrete pier, both substantially built. The span of the bridge is 183 feet. From the south end of the bridge the road is carried across the Thames valley on a wood pile trestle about 420 feet long. This trestle is capable of accommodating the same heavy traffic as the bridge. The bridge and trestle above referred to are shown in Figures 2, 3, 4 and 5 below.

From the south end of the above mentioned trestle the road is built on the public highway, occupying a position relative to the latter, as shown in Figure 6.

The public highway is followed to the north boundary of the County of Elgin where it enters upon a private right-of-way. See Figure 7, showing point at which the railway leaves the public highway and the County of Middlesex for the private right-of-way in the County of Elgin. The private right-of-way continues from the point above mentioned, into the City of St. Thomas.

At a point about one mile north of the City of St. Thomas the railway crosses underneath the Grand Trunk Railway, a subway having been constructed of sufficient width to accommodate a double track for the Grand Trunk Railway overhead.

The construction of this subway is substantial and conforms with the requirements of the Act.

Just outside of the St. Thomas city limits the railway crosses the Kettle Creek valley on a substantial wood trestle, and the Kettle Creek on a steel deck bridge of 109 feet span, supported at the north end by a concrete pier and at the south end by a concrete abutment with wing walls. The top of this abutment projects about eight (8) inches out of plumb and portions of the wing walls have been broken off, caused by filling in behind the abutment before the bridge was placed in position. The safety of the structure, however, in the opinion of the undersigned after careful inspection of the work and plans, is not materially affected. The bridge and trestle are capable of carrying safely the heaviest locomotives at present in use on steam roads in Ontario.

At the south end of the Kettle Creek trestle a $4\frac{1}{2}$ per cent grade commences and terminates at the present terminus in St. Thomas. Figures 8 and 9 give views of the trestle from the north end, and Figure 10 from the south end, respectively.

Figure 11 shows a car coming down the $4\frac{1}{2}$ per cent. grade and approaching the trestle.

The car as shown in Figure 11 is about half way down the grade. The road bed at this point is an embankment, but at the foot of the grade an excavation had to be cut into the hill.

To avoid expense of excavating, as far as possible, a compound curve was introduced into the trestle. This curve is shown in Figures 8, 9 and 10.

ROAD BED AND TRACK.

The road is single track, laid upon a substantial natural foundation of earth where considerations of grade conditions would permit, and substantially constructed earth embankment where the natural profile falls below the railway grade level.

Excavations were necessary at several places on the route and these have been finished with due regard for safety.

The rails are of "T" cross section, Am. Soc. C. E. Standard; weight, 60 pounds per yard. The rails are laid on cedar ties, standard spacing. A gravel ballast is used. The track is standard gauge, 4 feet $8\frac{1}{2}$ inches.

The track and road bed are well constructed, and at the time of inspection were in safe condition for traffic.

TURNOUTS AND SWITCHES.

Four turnouts are provided, about three miles apart, except between the third and fourth a gap of six miles occurs, between Tempo and Lyndhurst. This number is quite sufficient for the present hourly schedule and could be considered reasonably safe for a half-hourly schedule. All turnouts are equipped with spring split switches, as shown in Figure 12.

CURVES.

All curves occurring in the track have been carefully designed and well constructed, except that no curve has an outer rail elevation for a greater speed than ten miles per hour. In view of the fact that all of the curves are

in full view of the motorman a sufficient distance ahead to enable him to bring his car to low speed in ample time, the undersigned is of the opinion that, with one exception the probability of accident has been reduced to a minimum. The exception occurs at the Kettle River trestle, referred to on page 6, Figures 8, 9 and 10. If a car be started down the grade, as must be the case with every car leaving St. Thomas for London, it would be under present conditions, absolutely impossible to prevent a serious accident if the motorman were to lose control, either through his own disablement or negligence, or through the brakes becoming inoperative. The outer rail of the curve is elevated for a maximum speed of ten miles per hour, but the acceleration of speed due to gravity alone, of a car running down the grade without control, would result in the development of a speed of approximately forty miles per hour by the time the curve would be reached. The almost inevitable result would be the overturning of the car on the curve and its falling off the trestle, some fifteen feet, to the valley below.

In the opinion of the undersigned this defective condition should be corrected without unreasonable delay, by elevating the outer rail of the curve for a speed of forty miles per hour. A reasonable length of time within which the company should complete this work would be ninety days.

TERMINAL AND STATION FACILITIES.

The terminal facilities in the City of London are as shown in Figure 1. Figure 13 on next page, gives a view of the platform accommodation provided at the London terminal.

You will observe that no protection is provided against rain or storm, for passengers who may be compelled to wait on the platform any length of time.

It is the stated intention of the company to construct in the near future a combined office and station building, suitable for its own and the public services. The station accommodation is sufficient for the present traffic; waiting rooms and a ticket office are provided for the convenience of the travelling public.

In the Village of Lambeth a platform and open shed have been constructed for the convenience of passengers. This is quite adequate for the present requirements of the traffic.

At Alexandra Park, an amusement place established and owned by the company and distant about $7\frac{1}{2}$ miles from London, ample platform accommodation for the public has been provided.

At the Villages of Tempo and Talbotville no platform accommodation is provided, but in the opinion of the undersigned such accommodation is hardly required at present.

In the City of St. Thomas the present terminus of the line is coincident with the western terminus of the St. Thomas Municipal Street Railway. For views of these termini, see Figures 14 and 15 below.

The officers of the company have stated that it is their intention to connect their line, in the near future, with the St. Thomas Street Railway, and that waiting-room and ticket office accommodation will be provided for the passengers at a more central site on the main street of St. Thomas. Under these circumstances the undersigned is of the opinion that there is no immediate necessity to provide waiting-room accommodation at the present terminus of the line.

DRAINAGE.

Suitable ditches and drains have been provided along each side of and across and under the railway, commensurate with the maintenance of the road bed in a safe condition.

At several points, however, where excavation and cutting was necessary there is the possibility of a prolonged heavy fall of rain causing portions of the bank adjacent to the track to be precipitated upon the latter, but it is not intended to convey the idea that the conditions are any more dangerous than on any other railway. The exercise of ordinary precautions on the part of the motormen and track inspectors will obviate the probability of accidents occurring to the traffic.

CONSTRUCTION OF TRESTLES.

Careful inspection of the trestles at the Thames River and Kettle Creek crossings indicate that they are well constructed on substantial foundations and, so far as could be ascertained by visual examination and checking of the plans, are, except as noted below, quite safe for all present purposes.

At the south end of the Thames River trestle a defect in construction was observed, consisting of an insufficient bearing for the ends of the 8 in. x 18 in. stringers on the concrete abutment. As will be observed on reference to Figures 16 and 17 below, the bearing surface of each stringer is not more than four lineal inches, or about 32 square inches, whereas the bearing surface for each stringer should be at least 15 lineal inches, equivalent to 120 square inches. This defect should be remedied without unnecessary delay. The present traffic is comparatively light and there is no immediate danger, but the undersigned respectfully would recommend that the company be requested to replace the short stringers with ones of sufficient length, not later than March 1st, 1901.

HIGHWAY AND FARM CROSSINGS.

In respect to farm crossings the requirements of the Ontario Railway Act have been fulfilled.

In respect to the highway crossings, the requirements of the Ontario Railway Act have been fulfilled.

Sign boards, as required by the Act, have been erected at each highway crossing, with the words "Railway Crossing" painted on each side of the sign board.

CARS AND APPLIANCES.

The present rolling stock of the company consists of six standard street railway type semi-convertible cars with double trucks and self-contained motor equipments. They are well constructed and of attractive appearance and have a seating capacity for fifty persons each. Three of the cars have compartments for express and baggage, the other three are purely passenger cars. All cars are equipped with hand brakes, also with air brakes of the type known as the "Westinghouse Traction Brake," which operated very satisfactorily and efficiently while under the observation of the undersigned. Four cars are now in service on an hourly schedule.

The system of power distribution necessitates the use of two trolleys, the track forming the third conductor of the circuit. Owing to the length of the cars four trolleys are necessary, two at each end, of which the two at the rear end of the car, according to the direction of travel, are in use at one time.

The motor equipment of each car consists of two 130 H.P. alternating current, 3-phase motors.

The motorman's control equipment is in duplicate, one at each end of the car.

An electro-motive force of 1,000 volts is in use upon the trolley system without the intervention of reducing transformers upon the car, in consequence of which the motors are operated at the full pressure of 1,000 volts. The wires and other portions of the car equipment were inspected carefully, and it was found that all necessary precautions have been taken to protect the passengers and employees from accidental contact with wires or other portions of the equipment carrying the 1,000 volts pressure. An objection was noted, however, by the undersigned, namely, that no provision is made for the cutting out of the two trolleys from the circuit while they are not in service. With two trolleys on the line wires and the other two trolleys out of service, in the event of a motorman or an employee having to go on the roof of the car for any purpose and accidentally coming in contact with the two lower trolleys, he will be certain to receive the full line voltage through his body, and he would most probably be killed. It is a comparatively simple and inexpensive matter to instal automatic cut-out switches, so that when any pair of trolleys is not in use, it will be separated from the live portions of the circuit and thus rendered safe for handling. It will probably be argued that a motorman or employee is supposed to know that the lower trolleys are "alive," but in the opinion of the undersigned, the fact that the trolleys are lowered is an ever present suggestion that they are out of the circuit and consequently safe to handle. There is the further objection to leaving the forward trolleys in the circuit, namely, that in the event of these trolleys becoming crossed upon each other in the course of manoeuvring them into their retaining hooks, a violent short circuit would result, in consequence of which a shut-down of that section of the line might be caused. In any event it is, in the opinion of many engineers, decidedly bad practice to keep apparatus of this kind "alive" with high voltage when not in service.

The undersigned would therefore respectfully recommend that efficient and reliable automatic cut-outs be installed in series with the trolleys, as suggested above. A reasonable time within which the foregoing recommendation could be carried out would be three months.

None of the cars are equipped with fenders other than the ordinary pilot-board fenders on the lower trucks. There is therefore no provision made for the protection of persons from being run over by the car if through accident or otherwise they fall in front of it while it is in motion.

POWER GENERATING EQUIPMENT.

The generating equipment consists of a battery of three Babcock & Wilcox 360 H.P. water tube boilers, working at a steam pressure of 175 pounds per square inch. The boiler equipment is first-class in every respect and represents the highest type of design.

Also three Browett and Lindley, Manchester, England, 350 H.P., 375 R. P. M. single acting compound engines which are thoroughly first-class in every respect.

Each engine is direct connected to a Ganz & Co. 300 K. W. 3-phase, 25 cycle alternating current generator, delivering current at 10,000 volts without the intervention of step-up transformers. These generators are of high class type and are well constructed.

Taken as a whole, the power generating equipment is first-class, and all reasonable precautions have been taken in respect of safety.

POWER TRANSMISSION, DISTRIBUTION AND TELEPHONE SYSTEM.

The transmission of electric current to the car motors is accomplished by means of two hard drawn copper trolley wires of No. O. B. & S. gauge, the rails being used for the third conductor of the 3-phase system. The electromotive force on the trolley wires and rails is 1,000 volts.

The supply of power is generated at the power house at London at 10,000 volts, 3-phase, and is distributed to four sub-stations, $\frac{3}{4}$ mile, $6\frac{1}{4}$ miles, $10\frac{1}{2}$ miles and $16\frac{1}{2}$ miles respectively from the London terminus. At these sub-stations the voltage is stepped down from 10,000 volts to 1,000 volts for the trolley system.

A type of transmission line construction commonly used in southern Europe has been adopted for this road. The principal feature of this construction consists of placing the three transmission line wires in a vertical plane on pole brackets, instead of in the form of a triangle or in a horizontal plane or cross-arms as commonly in use in America. The method of construction as adopted on this road can be seen on referring to figures below.

Figure 18 shows a sub-station, also single pole and bracket line construction in use along the public highway.

Figure 19 shows double pole construction in use on the private right-of-way.

The undersigned is of the opinion that the European method of construction adopted is not as safe nor as desirable as the American method, because of the fact that with the poles of the ordinary height in use, the bottom wire of the transmission circuit is necessarily lower than in the case of the American method. As these conductors carry 10,000 volts, this is an important matter, and in the present case is rendered more objectionable on account of the telephone wires being placed immediately below in the same plane and only four feet from the lowest high voltage conductor. In the course of the inspection it was observed that the lowest transmission wire was dangerously near the upper telephone wire, a condition which may very easily result in the death of a lineman or a telephone operator coming into contact with the telephone circuit. The company stated that it is their intention to install safety transformers between the telephone lines and the instruments, but this will not lessen the danger to employees engaged in repairing the main telephone lines while the railroad is in operation.

The undersigned would respectfully recommend that while it may be hardly reasonable to expect the company to change the transmission line construction from the European to the American method, on the lines now finished, it is advisable that your Board should recommend that the company adopt the American method of construction on all such transmission lines as may be constructed in the future, especially where telephone lines are run on the same poles.

It is further recommended that the company change the construction of the present lines to prevent the possibility of the high voltage conductors coming in contact with the telephone lines. This can be effected by placing the telephone line conductors on the side of the pole opposite to that on which the transmission lines are placed.

CONCLUSION.

In conclusion, the undersigned begs to express the opinion that, taken as a whole, this railway system and equipment is a high class one, and that, except as noted in this report, it is in a safe condition for the handling of passenger and freight traffic. The undersigned would respectfully ask the attention of your Board to the fact that no attempt has as yet been made to run the cars of the South Western Traction Company over the direct current system of the St. Thomas Municipal Street Railway, hence no opinion can be expressed at present as to the general efficiency and safe operation of the Ganz alternating current system in conjunction with the direct current system in use in St. Thomas.

Respectfully submitted,

(Sgd.) RODERICK J. PARKE,
Consulting Electrical Engineer.

LIST 1.

ONTARIO ELECTRIC AND STEAM RAILWAYS THAT ARE UNDER THE JURISDICTION OF THE ONTARIO RAILWAY AND MUNICIPAL BOARD, THE TEMISKAMING AND NORTHERN ONTARIO RAILWAY COMMISSION, AND THE NIAGARA FALLS PARK COMMISSIONERS.

B.

Berlin and Waterloo Street Railway Company.

1. Ontario Statute, 1886.

Incorporated by Letters Patent, 6th August, 1886.

See Ontario Statutes, 1872, cap. 63.

Berlin and Bridgeport Electric Ry. leased by Berlin and Waterloo Street Ry. Co.

Brantford Street Railway Company.

1. Ontario Statute. (1879, cap. 73.)

Act to incorporate.

See Grand Valley Railway Company, also Woodstock, Thames Valley and Ingersoll Electric Ry. Co.

C.

Cornwall Street Railway Company.

1. The Cornwall Street Railway, Light and Power Co., Ltd., incorporated by Letters Patent, dated April 18th, 1902.

G.

Grand Valley Railway Company.

1. Ontario Statute. (1895, cap. 97.)

Act to incorporate.

2. Ontario Statute. (1896, cap. 102.)

Act to amend the Act to incorporate the Grand Valley Ry. Co.

3. Dominion Statute. (1900, cap. 73.)

See Port Dover, Brantford, Berlin and Goderich Ry. Co.

Declared to be a work for the general advantage of Canada.

4. Dominion Statute. (1902, cap. 91.)

Name changed to Grand Valley Ry. Co.

5. Dominion Statute. (1906, cap. 102.)

See Brantford Street Railway Company, also Woodstock, Thames Valley and Ingersoll Electric Railway Co. Ontario Statute.

Guelph Railway Company.

1. Ontario Statute. (1895, cap. 98.)

Act to incorporate and to confirm an agreement between the Corporation of the City of Guelph and George Sleeman.

2. Ontario Statute. (1901, cap. 79.)

3. Ontario Statute. (1903, cap. 95.)

Act respecting the Guelph Ry. Co. and to change the name of the Company to that of the Guelph Radial Ry. Co.

4. Ontario Statute. (1905, cap. 91.)

Act respecting the Guelph R. Ry. Co., and to confirm a by-law of the Corporation of the City of Guelph.

H.

Hamilton Street Railway Company.

1. Ontario Statute. (1873, cap. 100).
Act to incorporate.
2. Ontario Statute. (1893, cap. 90.)

Hamilton and Dundas Street Railway Company.

1. Ontario Statute. (1875-76, cap. 87.)
Act to incorporate.
2. Ontario Statute. (1879, cap. 59.)
Act to amend the Act incorporating the Hamilton and Dundas Ry. Co.
3. Ontario Statute. (1881, cap. 65.)
4. Ontario Statute. (1884, cap. 68.)
5. Ontario Statute. (1886, cap. 68.)
6. Ontario Statute. (1890, cap. 119.)
7. Ontario Statute. (1895, cap. 100.)
8. Ontario Statute. (1898, cap. 60.)

Hamilton Radial Electric Street Railway Company.

1. Ontario Statute. (1893, cap. 89).
Act to incorporate.
2. Ontario Statute. (1894, cap. 88.)
Act to incorporate.
3. Ontario Statute. (1895, cap. 101.)
4. Ontario Statute. (1896, cap. 103.)
5. Ontario Statute. (1900, cap. 112.)
6. Ontario Statute. (1904, cap. 77.)

Hamilton, Grimsby and Beamsville Electric Railway Company.

1. Ontario Statute. (1892, cap. 95.)
Act to incorporate.
2. Ontario Statute. (1897, cap. 87.)
An Act to confirm the agreement between the Hamilton, Grimsby & Beamsville El. Ry. Co., and the City of Hamilton.
3. Ontario Statute. (1901, cap. 80.)
Act to amend the Act incorporating the H., G. & B. El. Ry. Co.
4. Ontario Statute. (1904, cap. 76.)

Huntsville and Lake of Bays Railway Company.

1. Ontario Statute. (1900, cap. 113.)
Act to incorporate.
2. Ontario Statute. (1903, cap. 96.)
3. Ontario Statute. (1904, cap. 18.)
Subsection 1.
4. Ontario Statute. (1906, cap. 19.)
Section 39.

This line is constructed from the north end of Lake of Bays to the south end of Peninsula Lake, in the District of Muskoka; a cash subsidy of \$10,000 was paid in July on order of the O. R. & M. B.

It connects two lakes, is a narrow gauge railway, operated by steam. William John Emerson Duperow, of Huntsville, is general manager. 1½ miles in length.

I.

International Transit Company.

1. Ontario Statute. (1902, cap. 99.)
Incorporated by Letters Patent, 22nd May, 1888, under provisions of Joint Stock Companies' Act, cap. 157, R.S.O. 1897, etc.

K.

Kingston Street Railway Company.

1. Ontario Statute. (1875-76, cap. 74.)
Act to incorporate.
2. Ontario Statute. (1893, cap. 91.)
Act to amend the Act to incorporate the Kingston St. Ry. Co., and to change the name to "The Kingston, Portsmouth & Cataraqui Street Railway Company."
3. Ontario Statute. (1904, cap. 79.)
See The Kingston, Portsmouth & Cataraqui St. Ry. Co.

Kingston, Portsmouth and Cataraqui Street Railway Company.

1. Ontario Statute. (1875-76, cap. 74.)
Act to incorporate.
2. Ontario Statute. (1893, cap. 91.)
Act to amend the Act to incorporate the Kingston Street Ry. Co., and to change the name to "The Kingston, Portsmouth & Cataraqui Street Ry. Co."
3. Ontario Statute. (1895, cap. 105.)
4. Ontario Statute. (1898, cap. 61.)
5. Ontario Statute. (1904, cap. 79.)
6. Ontario Statute. (1906, cap. 111.)

L.

London Street Railway Company.

1. Ontario Statute. (1873, cap. 99.)
Act to incorporate.
2. Ontario Statute. (1889, cap. 79).
3. Ontario Statute. (1894, cap. 89.)
An Act to confirm the agreement between the London St. Ry. Co. and the Corporation of the Village of London West.
4. Ontario Statute. (1895, cap. 107.)
5. Ontario Statute. (1896, cap. 105.)
6. Ontario Statute. (1897, cap. 67.)
7. Ontario Statute. (1899, cap. 97.)
8. Ontario Statute. (1902, cap. 82.)
9. Ontario Statute. (1905, cap. 98.)

M.

Metropolitan Railway Company.

1. See Toronto & York Radial Ry. Co.

N.

Niagara Falls Park and River Railway Company.

1. Ontario Statute. (1892, cap. 96.)
Act to incorporate.
2. Dominion Statute. (1900, cap. 54.)
Power to acquire N.F.P. & R. Ry. Co.
3. Ontario Statute. (1901, cap. 86.)
See Dominion Statute, 1900, cap. 54.
An Act respecting the Buffalo Ry. Co.

O.

Ottawa City Passenger Railway Company. (Afterwards The Ottawa Electric Railway Co.)

1. Statutes of Canada. (1866.)
Act to incorporate.
2. Ontario Statutes. (1868, cap. 45.)
An Act to amend the Act intituled "An Act to incorporate the Ottawa City Passenger Ry. Co."
3. Ontario Statute. (1891.)
Ottawa Electric Street Railway Co., was on the 13th day of February, 1891, incorporated by Letters Patent, under the Joint Stock Co's. Act and Street Railway Act.
4. Dominion Statute. (1892, cap. 53.)
Declared to be a work for the general advantage of Canada, but the operation of so much of the Company's line of railway as may be within the Province of Ontario by any new or additional powers conferred by this Act, shall be subject to the Statutes of Ontario in force from time to time in relation to street railways.
5. Ontario Statute. (1894, cap. 76.)
Act to confirm an agreement between the City of Ottawa and the Ottawa City Passenger Ry. Co., and the Ottawa Electric St. Ry. Co.
6. Dominion Statute. (1894, cap. 86.)
An Act to confirm an agreement between the Ottawa City P. Ry. Co. and the Ottawa El. St. Ry. Co., and an agreement between the said Companies and the Corporation of the City of Ottawa and to unite said Companies under the name of "The Ottawa Electric Railway Company."
7. Dominion Statute. (1899, cap. 82.)
8. Dominion Statute. (1903, cap. 171.)
9. Dominion Statute. (1905, cap. 140.)
See Metropolitan Railway of Ottawa, "28 August, 1891, Ont. Letters Patent."

P.

Port Arthur and Fort William Railway Company.

1. Ontario Statute. (1891, cap. 93.)
Act to incorporate.
See Ontario Statutes, 1892, cap. 82, also 1893, cap. 78, intituled "An Act respecting the Town of Port Arthur."

Peterborough Radial Railway Company.

1. Ontario Statute. (1902, cap. 91.)
Act to incorporate.
2. Ontario Statute. (1906, cap. 116.)

S.

Sarnia Street Railway Company.

1. Ontario Statute. (1874, cap. 61.)
Act to incorporate.
2. Ontario Statute. (1902, cap. 95.)
3. Ontario Statute. (1903, cap. 114.)

Sandwich and Windsor Passenger Railway Company. (Afterwards the Sandwich, Windsor & Amherstburg Ry. Co.

1. Ontario Statute. (1871-72, cap. 64.)
Act to incorporate.
2. Ontario Statute. (1874, cap. 64.)
An Act to extend the time for the completion of the Sandwich and Windsor Passenger Ry.
3. Ontario Statute. (1887, cap. 80.)
Act to amend the Act incorporating the Sandwich and Windsor Passenger Ry. Co.
4. Ontario Statute. (1891, cap. 94.)
Act to further amend the Acts relating to the Sandwich, Windsor & Amherstburg Ry. Co.
5. Ontario Statute. (1893, cap. 97.)
Act to amend the Acts relating to the Sandwich, Windsor & Amherstburg Ry. Co.
6. Ontario Statute. (1898, cap. 62.)
7. Ontario Statute. (1902, cap. 94.)
Transfer by South Essex Electric Ry. Co. authorized.
8. Ontario Statute. (1903, cap. 112.)
Act respecting the Sarnia, Windsor & Amherstburg Ry. and the City Railway Company of Windsor.
The City Railway Co. of Windsor was incorporated under the provisions of "The Street Railway Act, R.S.C. 208."
9. Ontario Statute. (1904, cap. 88.)
Transfer from City Co. to Sandwich Co. authorized.
10. Ontario Statute. (1905, cap. 39.)
An Act respecting the Town of Amherstburg.

South-Western Traction Company.

1. Ontario Statute. (1902, cap. 96.)
Act to incorporate.
2. Ontario Statute. (1903, cap. 115.)
3. Ontario Statute. (1904, cap. 89.)
4. Ontario Statute. (1906, cap. 121.)

St. Thomas Street Railway Company.

1. Ontario Statute. (1878, cap. 53.)
Act to incorporate.
2. Ontario Statute. (1898, cap. 51.)
Act respecting the City of St. Thomas and the St. Thomas Street Ry. Co.
3. Ontario Statute. (1903, cap. 111.)

T.

Temiskaming and Northern Ontario Railway.

1. Ontario Statute. (1902, cap. 9.)
Act to authorize the construction of the T. & N. O. Ry.
2. Ontario Statute. (1903, cap. 4.)
Act to amend the T. & N. O. Ry. Act.
3. Ontario Statute. (1904, cap. 7.)
Act to amend the T. & N. O. Ry. Act.
4. Ontario Statute. (1905, cap. 10.)
Act to amend the T. & N. O. Ry. Act.
5. Ontario Statute. (1906, cap. 14.)
Act to amend the T. & N. O. Ry. Act.

Toronto Street Railway Company.

1. Statutes of Canada. (1861, cap. 83.)
Act to incorporate.
2. Ontario Statute. (1868-69, cap. 81.)
Act for the relief of the Toronto St. Ry. Co., and to provide for the sale of their Ry. and for other purposes.
3. Ontario Statute. (1873, cap. 101.)
Act to remove certain doubts as to the powers of the proprietors of the Toronto St. Ry., and to incorporate them and others under the name of "The Toronto Street Railway Co.," and for other purposes.
4. Ontario Statute. (1875-76, cap. 63.)
Act respecting the City of Toronto, the Toronto Street Ry. Co., and other matters.
5. Ontario Statute. (1877, cap. 85.)
6. Ontario Statute. (1884, cap. 77.)
Act to authorize the Toronto St. Ry. Co. to issue mortgage debentures and for other purposes.
7. Ontario Statute. (1886, cap. 80.)
Act to amend the Acts relating to the Toronto Street Ry. Co.
8. Ontario Statute. (1889, cap. 73.)
Power to borrow for purchase of Toronto St. Ry.
9. Ontario Statute. (1890, cap. 127.)
- 9(a) Ontario Statute. (1890, cap. 105.)
Act respecting the City of Toronto and the Toronto St. Ry.

Toronto Railway Company.

1. Ontario Statute. (1892, cap. 99.)
Act to incorporate the Toronto Railway Co. and confirm an agreement between the Corporation of the City of Toronto and George W. Kiely, William McKenzie, Henry A. Everett and Chauncey W. Woodworth.

Toronto Railway Company.—Continued.

2. Ontario Statute. (1893, cap. 101.)
3. Ontario Statute. (1894, cap. 93.)
4. Ontario Statute. (1904, cap. 93.)

Toronto and York Radial Railway Company.

1. Ontario Statute. (1898, cap. 66.)
Act to incorporate.
2. Ontario Statute. (1906, cap. 124.)
Act respecting the T. & Y. R. Ry. Co.
3. Ontario Statute.
Act respecting the Toronto & Scarboro' Electric Ry. Co., Light & Power Co.
4. Ontario Statute. (1898, cap. 65.)
Act to amend the Act of incorporation of the Toronto & Scarboro' El. Ry., L. & P. Co.
5. Ontario Statute. (1891, cap. 96.)
Act respecting the Toronto & Mimico El. Ry. & Light Co.
6. Ontario Statute. (1892, cap. 98.)
7. Ontario Statute. (1903, cap. 118.)

Metropolitan Street Railway Company.

1. Ontario Statute. (1877, cap. 84.)
Act to incorporate.
2. Ontario Statute. (1893, cap. 94.)
3. Ontario Statute. (1895, cap. 108.)
4. Ontario Statute. (1897, cap. 92.)
See Toronto & York Radial Ry. Co., 1898, cap. 66.
5. Ontario Statute. (1900, cap. 116.)
6. Ontario Statute. (1901, cap. 84.)

Toronto and Mimico Railway Company.

1. Incorporated by Letters Patent. 14 November, 1890.
2. Ontario Statute. (1904, cap. 92.)
Act respecting the Township of Toronto and the Toronto and Mimico Ry. Co.

Toronto Suburban Railway Company.

1. Ontario Statute. (1894, cap. 94.)
Act to incorporate.
2. Ontario Statute. (1900, cap. 103.)
Section "1".
3. Ontario Statute. (1900, cap. 124.)
4. Ontario Statute. (1901, cap. 91.)
5. Ontario Statute. (1904, cap. 94.)
See Metropolitan Street Ry. Co. and Toronto & York Radial Ry. Co., also Toronto & Mimico Electric Ry., also Toronto & Scarboro' Electric Ry.

W.

Windsor and Tecumseh Electric Railway Company.

1. Ontario Statute. (1904, cap. 96.)
Act to incorporate.
Power other than steam.
2. Ontario Statute. (1905, cap. 111.)
See Ontario Traction Co., agreement with.
Line to be operated when completed by the Sandwich, Windsor & Amherstburg Ry.

Woodstock, Thames Valley and Ingersoll Electric Railway Company.

1. Ontario Statute. (1900, cap. 127.)
Act to incorporate.
2. Ontario Statute. (1902, cap. 98.)
Act to amend the Act incorporating the Woodstock, Thames Valley & Ingersoll El. Ry. Co.

REPORT ON STREET RAILWAY FENDERS.

To the Ontario Railway and Municipal Board,
Parliament Buildings, Toronto, Ont.

GENTLEMEN.—Complying with your instructions to test and report on Street Railway Fenders we find:—

The Act.

Bill No. 146 of 1906 of the Legislative Assembly of the Province of Ontario, entitled "The Ontario Railway Act," enacts as follows:—

Section No. 209.

Fenders and other appliances.

"The company, when operating any portion of its line by means of electricity along a highway, shall from time to time adopt and use in front of such motor car a fender or guard, and shall from time to time adopt and use a brake and such other life saving appliances as shall be of a design approved from time to time by the Board as suitable for use by the company, having regard to the efficiency of such fender, guard, brake and other life saving appliances for life saving purposes, and to the location of the company's line, and the speed at which the company's cars may be run.

Section No. 210.

Fenders, etc., to be adopted when ordered.
Proviso.

"The fender, guard, brake or other life saving appliance so approved of by the Board shall be adopted and used upon the cars of the company within the time fixed by the order approving of the same, or by an order extending the said time, provided that when the cars of a company are equipped with fenders of a class so approved by the Board the company shall not be liable for non-compliance with any by-law or agreement relating to the class of fenders to be used in any city, or town, or any requirement of the engineer or other officer of the municipality under any such by-law or agreement.

"The company shall pay to the corporation of the municipality in which such road is operated the sum of ten dollars for each day in which any motor car is operated within such municipality without having such a fender, guard, brake or other life saving appliance thereon, except in cases of accident or unavoidable necessity; such sum or sums to be recovered from such company in a civil action." Section No. 211. Penalties for not providing fenders, etc.

"If the Board shall so order, the company shall allow tests to be made on any of its motors or cars, of any fender, guard, brake, or other life saving appliance that the Board may consider it advisable to have tested with a view to ascertaining its efficiency for the purpose for which it is designed." Section No. 212. Tests of fenders, brakes, etc.

No one subject, in connection with the operation of comparatively rapid transit cars upon our streets can possibly interest the public more than that of the street railway fender. No effort should be spared to obtain the best and most efficient life saving device to attach to the forward end of cars operating in crowded streets. Public.

When we consider that any of us, or any member of our family, with practically no warning, is liable to come into contact with the forward end of a moving car, we cannot give too great encouragement to inventors in their effort to produce the best possible fender, nor be too ready to accept the best when proved as such from time to time in accordance with the provisions of the Act.

The number of difficulties incident to obtaining a first-class fender are recognized more readily by those familiar with the operation of street cars and electric railways than by the public itself. Many prohibitive objections are apparent at once to the street railway man, but the dreadful results of these objections and faults are only too apparent to the public in the enormous number of fatalities due to poor fenders and their failure to operate at the exact instant when required. A little boy jumps from behind a wagon, and with the usual lack of consideration shown at his age, starts for the side-walk, when a car he did not see (and the motor-man of which did not see him), grinds into a scarcely recognizable mass, what only a few seconds before was perfection of life and happiness. Difficulties of obtaining a first-class fender. Fatalities due to poor designs.

The list of fatalities where an automatic fender would have saved (and with people of all ages) is appalling as to their number, and the horror and rapidity of their execution. Accidents.

The short space of time elapsing between the appearance of the victim and the contact of the latter with the car, together with the very natural agitation of the motorman under such circumstances renders it practically impossible for him to effectively operate a fender.

Ringling the gong, turning on and off the current and applying the brakes are performed so often as to become almost an unconscious mechanical action. Whereas the unusual and rare occasions of dropping a fender necessitates the mental guidance of the motorman for its accomplishment.

The lack of necessary time for this tripping, and the uncertainty of its effectiveness, makes apparent the demand for an *automatic device* which must—

Be dropped to the paving by coming in contact with the person to be saved. First.

Second.

Must be automatically dropped with a *minimum impact* or slight blow of tripping device so that fenders may go well under the object *without damage* to the latter.

Third.

This must be done with incredible rapidity. For example, if the car is travelling at the rate of only ten miles an hour the fender must be dropped from its normal height to the pavement in one-fifteenth of a second in order to pass under the object struck, as at that speed the car travels approximately fifteen feet a second. For this reason it will be quite obvious that dropping by gravity at a speed of ten miles an hour is entirely inadequate.

Fourth.

The fender must be held in its position against the friction of the pavement caused by the onward motion of the car and must be of such construction as to pass under the object and not rise and go over it. The inclination to roll away or over the object creates a tendency to force the fender up from the road bed. And for this reason we recommend that a wheel guard be used in all cases, the latter to be rigidly fastened to the truck of the car and to be not more than two inches above the top of the rail, and in shape to be straight, *i.e.*, at right angles to the rail. Said wheel guard to be made either of wood or heavy wire and substantially framed. Samples of wheel guards with necessary fittings to be submitted to your engineers for approval before being adopted. In addition to this the space on either side at back of the fender and between it and the forward wheels should be protected with a substantial wire screen or other appliance, approved by your engineers, to prevent a body from being turned in behind the fender and in front of the wheels in the event of being struck by the corner of the fender.

Fails to be
flush with
streets.

Section No. 217. Clause "B" of the Act provides in all cases where the rails are laid upon the paved or travelled portion of the street, or any part thereof, the rails shall be laid (as nearly as practicable) flush with the street, and shall be laid so as to cause the least possible impediment to the ordinary traffic of the street, and shall be so kept and maintained by the railway company. We regret that in Toronto this is not the case, the variation between the height of the rails in many sections of the city, together with the high crossings and the approach to steep grades, necessitates carrying the fender at a height of about six inches.

The oscilation of single truck cars nessitate a fender of the best design to be hung on the truck so as to be practically non-oscilating and minimizing its movement with the movement of the car.

The records of tests of the Twentieth Century Fender in the past impresses us with the fact that the working parts of any fender to be adopted should be uniform in location, simple and easily understood by the motorman, so as to be readily kept in perfect condition. In this connection we would strongly recommend that your engineers make a periodical, and so far as the company is concerned, an unlooked for inspection of the life saving equipments of the cars, with power to prosecute any case where fenders are found not to be in good working order. It does not appear clear to us that clause 211 of the Act sufficiently covers the proper maintenance by companies of approved fenders and their being kept in good working order. We would, therefore, recommend to your honorable Board an addition to the Act "providing a substantial penalty for the carrying of defective fenders, guards, brakes or other life

saving appliances." As a fender operated and not maintained *as approved*, is not and should not be regarded in law, as complying with the Act. It also appeals to us that your honorable Board should have power, as recommended by your engineers, to recall their approval of fenders, or wheel guards, at any time if the fenders or wheel guards should prove inefficient, or when same may be replaced by something decidedly better in design and operation.

Invitations were issued by your engineers to a number of inventors and manufacturers of fenders that on the 27th of November, we would make a public test of same for the purpose of recommending for adoption on cars in the City of Toronto such devices, as in their opinion best answered the requirements. In answer to our invitations application was made to the Street Railway by some sixteen inventors for street cars and the necessary appliances for making the test. Without an exception every convenience and assistance to facilitate this was given these inventors by the Street Railway Company to make a most thorough test. The tracks available were on Sherbourne Street and Howard Park Avenue, of which we chose the latter as being more free from traffic and other interruptions.

The 27th unfortunately was wet and unfit for the first test which was postponed until the 28th and completed on the 29th. On the 15th and 16th of this month (January) a number submitted by different inventors were also tested, and three or four are yet being prepared for testing. Each one was thoroughly tested until we were able to form an accurate estimate of its value. Among the fenders tested there were several which, while they did not come up to the standard of efficiency considered necessary, contained many unique and ingenious features. And some of these fenders we have no doubt with some improvements and modifications might yet meet the demands for an efficient life saver. There were also two fenders of the trip variety, viz., the Twentieth Century and the Odell Fender, which in that class might be considered to have special merit, but, as we have already indicated, a trip fender on crowded streets, like those of the City of Toronto, is unsafe, and in our opinion should not be permitted to be used for a longer period of time than will be fair and reasonable to permit of the change to another design, say about six months. Until this change is made we recommend that the trips of the Twentieth Century fender should be changed as shown on the one tested, *i.e.*, the shorter lever on the platform dropping the fender, the longer one to be used only for resetting the same, and that these trips should be uniformly located, conveniently to the motorman, about the centre of the platform, and not as now on some cars in the centre and on others at the extreme edge, and that these fenders be kept in proper working order with their locks on and operative.

We recommend that these changes be made within sixty days after date of notification from your Board, that said changes are necessary, and further, that your Board instruct your engineers to take steps, such as are necessary, to insure that your instructions in this respect are being complied with.

Under all the circumstances and having regard to the whole situation we feel that at the present time there is only one fender among those which we have tested up to date, and which seem to

fill the requirements of a life saving device for the front of electric cars in the City of Toronto, namely, the fender manufactured by the Jenkins' Automatic Fender Company of Toronto, and we therefore beg to recommend the same to your honorable Board for adoption. We further recommend that the Toronto Street Railway should discard all other fenders and equip their cars with the Jenkins' Automatic Fender within six months from date of this report.

We beg to express the opinion, however, that certain improvements will be made in several of the fenders which have been tested, and before very long we may be in a position to recommend for your approval at least one or two more automatic fenders.

Re further life
saving
appliances.

We recommend for your consideration for adoption, a gong to be rung under the rear platform of all cars when backing or wying. This to be substantially a part of the device as shown by Mr. A. D. Bentley and tested by us on the 29th of November and again on the 16th of January.

It should be a gong sufficiently loud, and operated electrically or otherwise, controlled from the front platform by the motorman and subject to the approval of your engineers.

Passing cars.

We recommend that cars slow down to at least three miles an hour on approaching other cars that are letting off passengers. A large percentage of accidents are caused by passengers stepping from behind a standing car immediately in front of one moving in the opposite direction. For this reason on some roads cars slack up on meeting others stopped to let off passengers, and on other roads the approaching car comes to a full stop before passing the stationary car.

All of which is respectfully submitted,

J. F. WYSE,

H. W. MIDDLEMIST,
Engineers.

ANNUAL REPORT OF THE

RAILWAY COMPANY.

TO THE ONTARIO RAILWAY AND MUNICIPAL BOARD.

For the Year Ending December 31, 190 . Printed by Order of the Legislative Assembly of Ontario.

PARLIAMENT BUILDINGS,
TORONTO, Dec. 31st, 190

RE ANNUAL REPORT.

DEAR SIR,—Blank forms for the Annual Reports, as required by Sections 228/235 of the Ontario Railway Act of 1906, are herewith transmitted.

The value of the Reports, not only to the Legislature and to the public, but to the Companies themselves, depends on their accuracy and completeness. Special pains should, therefore, be taken to make the reports as full

and as exact as possible, so that comparisons, averages, and all deductions based thereon, may be reliable. Uniformity in detail is especially desirable, and to secure this result is is essential that the explanations and directions in the foot notes be closely observed and that no changes be made in the Blank Forms.

Please annex to or send with the report, copies of all leases and contracts made with other Companies and individuals during the year. You will greatly oblige the Board by filling up the reports and returning same as soon as possible. The by-laws of your Company, together with the rules and regulations of your Company, should also be transmitted to the Board, (if not already sent) without delay.

The Statute requires that the annual report shall be transmitted to the Board on or before

To.....
.....

ANNUAL REPORT OF THE RAILWAY COMPANY TO THE ONTARIO
RAILWAY AND MUNICIPAL BOARD.

FOR THE YEAR ENDING DECEMBER 31, 190 .

Printed by order of the Legislative Assembly of Ontario.

GENERAL INFORMATION.

Name of Municipality or Municipalities in which railway operates
.....
Name of Company
Date of Incorporation
Dates of Subsequent Legislation
.....
.....
.....
Date of Expiry of Franchise
Amount paid to Municipality per year per mile of track\$.....
Further amounts, if any, paid to Municipality by way of percentage of
earnings, % on \$\$.....
Total amount paid Municipality during year for franchise\$.....
Appraised value of Plant and Tracks for purposes of Taxation
Total Taxes paid during year to Municipality
Amount of Aid received from Municipality, if any
Power consumed per car mile in kilowatt hours
Cost per horse power for motive power used in operating plant
Cost of power per kilowatt per hour
Cost of power per car mile
Average speed of cars
State if power is purchased or generated by Company
State if power is generated by steam or water power
Give number of power houses

EARNINGS AND EXPENSES OF OPERATION.

<i>Earnings from Operation.</i>	
Receipts from passengers carried.....	
from carriage of mails.....	
from carriage of express and parcels.....	
from carriage of freight.....	
from tolls for use of tracks by other companies.....	
for rentals of buildings and other property.....	
from advertising in cars.....	
from interest on deposits.....	
Other earnings from operation*.....	
.....	
Gross earnings from operation.....	
<i>Expenses of Operation.</i>	
General Expenses :	
Salaries of General officers and clerks and attendants.....	
General office expenses and supplies.....	
Legal expenses.....	
Insurance.....	
Switching charges, if any.....	
Other general expenses *.....	
Maintenance of Roadbed and Buildings:	
Repair of roadbed and track.....	
Repair of electric line construction.....	
Repair of buildings.....	
Maintenance of Equipment:	
Repair of Cars.....	
Repair of electric equipment of cars.....	
Repair of miscellaneous equipment.....	
Provender and stabling.....	
Transportation Expenses:	
Cost of electric motive power, \$.....	
less power sold, \$.....net.....	
Wages and compensation of persons employed in	
conducting transportation.....	
Removal of snow and ice.....	
Damages for injuries to persons and property.....	
Tolls for trackage over other railways.....	
Rentals of buildings and other property.....	
Other transportation expenses*.....	
.....	
Total operating expenses.....	

* Specifying same.

PROPERTY ACCOUNTS—ADDITIONS AND DEDUCTIONS DURING THE YEAR.

Addition to Railway:								
Extension of tracks (length.....feet)...	.....	.....	.....	.....	.....	.....	.....	.....
New electric line construction (length,.....feet).....	.....	.....	.....	.....	.....	.....	.....	.....
Other additions to Railway *	.....	.....	.....	.....	.....	.....	.....	.....

TOTAL ADDITIONS TO RAILWAY .....	.....	.....	.....	.....	.....	.....	.....	.....
Additions to equipment:								
Additional cars (.....in number)...	.....	.....	.....	.....	.....	.....	.....	.....
Electric equipment of same.....	.....	.....	.....	.....	.....	.....	.....	.....
Other additional rolling stock.....	.....	.....	.....	.....	.....	.....	.....	.....
Other additions to equipment *.....	.....	.....	.....	.....	.....	.....	.....	.....

TOTAL ADDITIONS TO EQUIPMENT.....	.....	.....	.....	.....	.....	.....	.....	.....
Additions to land and Buildings								
Additional land necessary for operation of Railway,.....	.....	.....	.....	.....	.....	.....	.....	.....
New electric power stations, including machinery, etc.....	.....	.....	.....	.....	.....	.....	.....	.....
Additional equipment of power stations....	.....	.....	.....	.....	.....	.....	.....	.....
Other new buildings necessary for operation of railway.....	.....	.....	.....	.....	.....	.....	.....	.....

TOTAL ADDITIONS TO LAND AND BUILDINGS.....	.....	.....	.....	.....	.....	.....	.....	.....
Additions to other permanent property : *								
.....
.....
.....
.....

TOTAL ADDITIONS TO OTHER PERMANENT PROPERTY.....	.....	.....	.....	.....	.....	.....	.....	.....
TOTAL ADDITIONS TO PROPERTY ACCOUNTS.....	.....	.....	.....	.....	.....	.....	.....	.....
Deductions from property accounts (property sold or reduced in valuation and credited to property accounts) : *								
.....
.....
.....
.....
.....
.....
.....

TOTAL DEDUCTIONS FROM PROPERTY ACCOUNTS.....	.....	.....	.....	.....	.....	.....	.....	.....
NET ADDITION TO PROPERTY ACCOUNTS FOR THE YEAR.....	.....	.....	.....	.....	.....	.....	.....	.....

* Specifying same.

GENERAL BALANCE SHEET.

ASSETS.

Cost of railway:				
Roadbed and tracks.....				
Electric line construction, including poles, wiring, feeder lines, etc.....				
Interest accrued during construction of rail- way.....				
Engineering and other expenses incident to construction.....				
Other items of railway cost *.....				
TOTAL COST OF RAILWAY OWNED.....				
Cost of equipment:				
Passenger Cars and other rolling stock.....				
Electric equipment of same.....				
Other items of equipment *.....				
TOTAL COST OF EQUIPMENT OWNED.....				
Cost of land and buildings:				
Land necessary for operation of Railway..				
Electric power stations, including equip- ment.....				
Other buildings necessary for operation of railway.....				
TOTAL COST OF LAND AND BUILDINGS OWNED.....				
Other permanent property †.....				
TOTAL COST OF OTHER PERMANENT PROPERTY OWNED.....				
TOTAL PERMANENT INVESTMENTS.....				
Cash and current assets:				
Cash.....				
Bills and accounts receivable.....				
Sinking and other special funds.....				
Other cash and current assets *.....				
TOTAL CASH AND CURRENT ASSETS.....				
Miscellaneous assets				
Materials and supplies.....*				
Other assets and property *.....				
TOTAL MISCELLANEOUS ASSETS.....				
Profit and Loss Balance—Deficit.....				
TOTAL.....				

* Specifying same.

† Investments of a permanent character, including lands, buildings and other property owned, which is not necessary for operation of railway, *specifying same*.

SEPTEMBER.

LIABILITIES.							
Capital stock, common,.....							
preferred,							
TOTAL CAPITAL STOCK							
Funded debt,.....							
Real Estate mortgages,.....							
Current liabilities:							
Loans and notes payable,.....							
Audited vouchers and accounts,.....							
Salaries and wages,.....							
Dividends not called for,.....							
Matured interest coupons unpaid,.....							
Rentals due and unpaid,.....							
Miscellaneous current liabilities: *.....							
.....							
.....							
TOTAL CURRENT LIABILITIES,.....							
Accrued liabilities:							
Interest accrued and not yet due,.....							
Taxes accrued and not yet due,.....							
Rentals accrued and not yet due,.....							
Miscellaneous accrued liabilities: *.....							
.....							
.....							
TOTAL ACCRUED LIABILITIES,.....							
Sinking and other special funds: *.....							
.....							
.....							
TOTAL SINKING AND OTHER SPECIAL FUNDS,.....							
Profit and Loss Balance—Surplus.....							
TOTAL.....							

* Specifying same.

CAPITAL STOCK—REAL ESTATE MORTGAGES.

CAPITAL STOCK

[illegible]

REAL ESTATE MORTGAGES.

[illegible]

*Give month, day and year.

VOLUME OF TRAFFIC—EQUIPMENT, ETC. - -*Continued.*[illegible]

<i>Miscellaneous Equipment.</i>	Total Number.
Barges and omnibuses
Carts and snow sleds
Other railway rolling stock:†
.....
Other highway vehicles:†
.....
Horse
Other items of equipment:†
.....
.....
.....

*Not to include persons riding free or riding on a free transfer ticket.

†Specifying same.

DESCRIPTION OF RAILWAY OWNED AND OPERATED.

Railway Owned Leased and Operated (By Electric Power).

Railway Owned, etc.	Owned.	Held under lease or Contract.	Trackage over other Railways.	Total Owned, Leased, etc.	Total Operated.
Length* of railway line
of second main track
Total length of main track...
Length of sidings, switches, etc.
Total, computed as single track
Length of line under construction

Description of Freight Carried.

For the Year ending 30th December, 190 .

[illegible]

Description Road Bed, Etc.

Rails.		Weight per Yard.		No. Ties to Mile.	General Remarks.
Steel.	Iron.	Steel.	Iron.		
.....
.....
.....
.....
.....
.....
.....
.....
.....

Names of the several cities and towns in which the railways operated by the Company are located

*Length in all cases to be given in miles or decimals of a mile carried to three places.
†Whether owned or operated under lease or operating contract, and including also trackage over other railways.
‡Not to include car-house and other private tracks for company use only.

GRADE CROSSINGS WITH RAILROADS, ETC.

Grade Crossings with Railroads.	Un-protected	How Protected	Number of Tracks at Crossing.	
			Railroad Tracks.	Railway Tracks.
Crossings of railways* with railroads at grade (.....in number), viz.:				
With†
With
With
With
With
With
With
With
With
With
With
With
With
With
No. junctions with other railways
No. of overhead bridges
No. of highway crossings
Height of overhead bridges above rail level
Radius of sharpest curve
No. of feet per mile of heaviest gradient
Gauge of railway
Width of devil strip
Total number of tracks at crossings
Number of above crossings at which frogs are inserted in the tracks

*Include crossings on all lines owned or operated under lease or operating contract in Ontario only.
†Specify name of railroad, and of the street, and city or town where each crossing occurs, and the number of railroad and railway tracks respectively, which there cross each other.

General Remarks and Explanations.

SUMMARY OF ACCIDENTS TO PROPERTY.

31st December, 190 .

ACCIDENTS.	DUE TO UNAVOID- ABLE CAUSES.		DUE TO CARELESSNESS OF EMPLOYEES.		DUE TO CARELESSNESS OF OTHER PERSONS.	
	Serious.	Trivial.	Serious.	Trivial.	Serious.	Trivial.
Damage to Company's property						
Damage to property of muni- cipality						
Damage to private property						
Total						

Total amount paid during year for damages caused by accidents

ACCIDENTS TO PERSONS.*

KILLED AND INJURED.	FROM CAUSES BEYOND THEIR OWN CONTROL.		FROM THEIR OWN MISCONDUCT OR CARELESSNESS.		TOTAL.	
	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
Passengers						
Employees						
Other persons						
Totals						

Statement of Each Accident.

*Include not only fatal and severe injuries, but also those which are less serious, if not so slight as to be trivial.

WAGES STREET RAILWAY COMPANIES OR RADIAL RAILWAYS.

	No. Employ- ed.	Average No. of Hours on Duty per Day.	Wages per Day.		
			1st Yr.	2nd Yr.	3rd Y.
Inspectors					
Conductors					
Motormen					
Starters					
Roadmen					
Linemen					
Engineers					
Blacksmiths					
Firemen					
Electricians					
Armature Winders					
Machinists and Mechanics					
Car Cleaners					
Average number of employees					
Watchmen					
Switchmen and Crossing tenders					

CORPORATE ORGANIZATION.

Corporate Name and Address of the Company.

(Give full Corporate Name and Place of Principal Business Office).

.....

.....

Names and Business Address of Principal Officers.*

President

Vice President

Treasurer

Clerk of Corporation

General Counsel

Auditor

General Manager

Superintendent

Name of officer and address to whom correspondence regarding this report should be addressed: Name Title Address

Names and Residence of Board of Directors.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

*Give first Christian name in full.

SIGNATURES AND OATH TO REPORT.

We hereby certify that the statements contained in the foregoing report are full, just and true.

.....	}	Directors of the
.....		
.....		
.....		
.....		
.....		
.....		
.....		
.....		
.....		
.....		Railway Company.
.....		
.....		Treasurer.
.....		Superintendent.

Province of Ontario.

..... ss.190 . Then personally appeared
the above named
.....
.....
.....
and severally made oath that the foregoing certificate by them subscribed is, to the
best of their knowledge and belief, true.

Before me,Justice of the Peace.

ANNUAL REPORT TO THE ONTARIO RAILWAY AND MUNICIPAL
BOARD, PUBLIC UTILITIES BRANCH.

ELECTRIC LIGHT AND POWER SECTION.

From the Municipality of the _____ of _____, for the year ending December
31, 190 _____. Printed by Order of the Legislative Assembly of Ontario.

PARLIAMENT BUILDINGS,
TORONTO, ONT., Dec. 31, 190

To the Municipality of.....

Blank forms for annual reports of Municipalities operating public utilities as required by the *Ontario Railway and Municipal Board Act*, are herewith transmitted. The value of these reports, not only to the Legislature but to the citizens of the respective Municipalities and the public generally, depends on their accuracy and completeness. Special attention should therefore be taken to make the reports as full and as exact as possible, so that comparisons, averages and all deductions based thereon may be reliable. Uniformity in detail is especially desirable and it is essential that no changes should be made in the blank form.

The Board will be greatly obliged if the reports are completed and returned as soon as possible. The Statute requires that the annual report should be transmitted on or before.....date.

PUBLIC UTILITIES—ELECTRIC LIGHT AND POWER PLANTS.

The following Questions to be Answered by Municipalities.

Name of municipality
Title of municipal lighting; power board or officer in authority
Name and official title of person to whom correspondence should be addressed
.....
Date of vote to establish plant When installed?
Result of election if within the year
.....
Reference to any special Act of Legislature affecting operation of plant
Did municipality acquire a private plant already in use or any portion of it or did it purchase and install a new and independent plant?
Does municipality purchase any electric current? of so, from whom does it purchase? ...
.....
Amount of electric current purchased and price paid
.....
When does the fiscal year of the municipality end?
Total assessed valuation of real estate in the village, town or city\$.....
Appropriation for power and lighting since December 30, 190\$.....
Amount at par of bonds issued during year ending December 31, 190 ,
for lighting and power purposes
Amount received from same at sale
Amount of outstanding debentures 31st December 190 ,
Amount of salary paid to members of municipal lighting board
Full names and addresses of the members of the board :
.....
.....
.....
.....
.....

PUBLIC UTILITIES—ELECTRIC LIGHT AND POWER PLANTS.

Questions to be Answered by Municipalities.

1. If steam power plant, give	
A. Number of engines	Total rated capacity H. P.
B. Number of boilers	Total rated capacity H. P.
2. If water plant, give	
A. Number of turbines	Type
B. Diameter of turbines	Direct connected or belted
C. Working head	Rated H. P.
3. Give number of generating stations	Give number sub-stations
4. Give K. W. capacity of each G. S.	
5. Give K. W. capacity of each S. S.	Give equipment..... Give K. W. cap.....
6. Give number of D. C. constant Potential dynamos	Rated capacity K. W.
7. Give number of D. C. dynamos	Rated capacity K. W.
8. Give number of alternating C.dynamos....	Rated capacity K. W.
9. Power lines. No circuits	Voltage
10. Give number and size of main wires.....	Length in miles
11. Give number feeder wire	Length in miles
12. Miles of street served	Length underground lines
13. Miles of street served	Length of aerial lines

PUBLIC UTILITIES—ELECTRIC LIGHT AND POWER PLANTS.

The following Questions to be Answered by Municipalities.

Motive power	{	Steam	
		Gas	
		Water	
The number of commercial arc lamps supplied			
Nominal candle power			
The number of municipal arc lamps supplied			
Nominal candle power			
The number of municipal incandescent lamps supplied			
Nominal candle power			
The number of commercial incandescent lamps supplied			
Nominal candle power			
Amount of power supplied to customers K. W.			
Price charged for commercial arc lamps			
Price charged for commercial incandescent lamps			
Price charged for electric power per K. W.			
Cost per public arc lamp per annum. (Estimated)			
Number of hours per year			
Cost per public incandescent lamp. (Estimated)			
Number of hours per year			
Does interest on bonded indebtedness for lighting purposes form part of cost in above estimates			
.....			
Remarks. (Any other information deemed pertinent which will aid the board in collecting useful data)			
.....			
.....			
.....			

PUBLIC UTILITIES—ELECTRIC LIGHT AND POWER PLANTS.

The following Questions to be Answered by Municipalities.

Is current furnished for street railway service?			
If so, give total K. W. H. so supplied during year			
Total connected load.	{	Arc service	K. W.
		Incandescent service	K. W.
		Power service	K. W.
Total			K. W.
Number of kilowatt hours produced during the year from			
D. C. series arc generators			
Number of kilowatt hours produced during the year from			
D. C. power generators			
Number of kilowatt hours produced during the year from			
other D. C. generators			
Number of kilowatt hours produced during the year from			
A. C. generators			
Total number of kilowatt hours produced during year			
Number of kilowatt hours sold during the year from			
D. C. series arc generators			
Number of kilowatt hours sold during the year from			
D. C. power generators			
Number of kilowatt hours sold during the year from			
other D. C. generators			
Number of kilowatt hours sold during the year from			
A. C. generators			
Total kilowatt hours sold during the year			
Total kilowatt hours unaccounted for			
Per cent. accounted for			

Questions to be Answered by Municipalities—Continued.

	K.W.	DATE.
Maximum D. C. series arcs load during year		
Maximum D. C. power load during year		
Maximum load during year on other D. C. generators		
Maximum A. C. load during year		
Maximum total load on stations during year		

Is current furnished for light during the daytime?

Is current furnished for power during the daytime?

Does municipality wire buildings? If so, on what terms?

On what terms does municipality furnish first installation and renewals of incandescent lamps?

.....

.....

PUBLIC UTILITIES—ELECTRIC LIGHT AND POWER PLANTS.

Following Questions to be Answered by Municipalities.

GROSS EARNINGS FROM OPERATION.

RECEIPTS.				
From commercial arc lights, flat rate (less discounts).....				
From commercial incandescent lights, flat rate, (less discounts)				
From commercial and incandescent lights, by meter, (less discounts)				
From arc and incandescent lights in public buildings (less discounts)				
From street arc lights (less discounts)				
From street incandescent lights (less discounts)				
From commercial power service (less discounts)				
From municipal power service (less discounts)				
From railway service (less discounts)				
From charging automobiles (less discounts)				
Total from light and power				
From other sources:				
Rent of motors and fixtures				
Rent of meters				
Miscellaneous (specify)				
Gross earnings from operation				

OPERATING EXPENSES—ELECTRIC LIGHT AND POWER PLANT.

The following Questions to be Answered by Municipalities.

PRODUCTION :

Salaries, production .....	\$.....	\$.....	.....
Labor, production.....	.....	.....	.....
Fuel .....	.....	.....	.....
Oil, waste and sundries.....	.....	.....	.....
Water .....	.....	.....	.....
Water rights .....	.....	.....	.....
Repairs, buildings and structures.....	.....	.....	.....
Repairs, motive power.....	.....	.....	.....
Repairs, electric apparatus.....	.....	.....	.....
Station expense.....	.....	.....	.....
Power purchased.....	.....	.....	.....

DISTRIBUTION :

Salaries, distribution .....	.....	.....	.....
Sub-station, labor and expense.....	.....	.....	.....
Distribution expense .....	.....	.....	.....
Incandescent Lamp Renewals.....	.....	.....	.....
Wiring and jobbing .....	.....	.....	.....
Operating and repairing street lamps .....	.....	.....	.....
Repairs, sub-station buildings and apparatus.....	.....	.....	.....
Repairs, poles and lines.....	.....	.....	.....
Repairs, subways and cables .....	.....	.....	.....
Repairs, meters .....	.....	.....	.....
Repairs, transformers.....	.....	.....	.....
Repairs, commercial arc lamps.....	.....	.....	.....

GENERAL EXPENSE :

Office salaries.....	.....	.....	.....
Office expense.....	.....	.....	.....
Registering and collecting .....	.....	.....	.....
Legal expense.....	.....	.....	.....
General expense .....	.....	.....	.....
Advertising.....	.....	.....	.....
Leaseholds, rentals, etc. ....	.....	.....	.....
Damages .....	.....	.....	.....
Depreciation.....	.....	.....	.....

STEAM HEATING DEPARTMENT :

.....
.....
.....
.....
.....

Total Operating Expenses—Electric.....

PUBLIC UTILITIES—ELECTRIC LIGHT AND POWER PLANTS.

Income Account.

Year ending December 31, 190 .

Gross earnings, power and lighting .....	.....	.....	.....
Less operating expenses .....	.....	.....	.....
Net earnings from operation .....	.....	.....	.....
Deductions from Net Income.			
Interest on debenture debt .....	.....	.....	.....
Sinking fund .....	.....	.....	.....
Reconstruction reserve fund .....	.....	.....	.....
Other funds (specify) .....	.....	.....	.....
.....
*Surplus (or deficit) for year .....	.....	.....	.....

*If net loss or deficit insert figures in red ink.

PUBLIC UTILITIES—ELECTRIC LIGHT AND POWER PLANTS.
The following Questions to be Answered by Municipalities.
SINKING FUND.

DR.				
To balance Dec. 31, 190.....				
To amount from appropriation dated.....	\$.....		\$.....	
To income during the year from amount invested.....				
			\$.....	
CR.				
By bonds cancelled.....	\$.....		\$.....	
By other items (giving particulars).....				
By balance to new account, Dec. 31, 190.....				
			\$.....	

How is fund invested

PUBLIC UTILITIES—ELECTRIC LIGHT AND POWER PLANTS.
CONSTRUCTION AND EQUIPMENT.

The following Questions to be Answered by Corporations and Municipalities.

	Debits during Year.	Credits during Year.	Amount to Dec. 31, 190
Organization			
Franchises			
Land occupied by generating stations			
Land occupied by sub-stations			
Water rights			
Hydraulic structures			
Generating station buildings			
Sub-station buildings			
Other real estate			
Rights of way			
Hydraulic machinery and apparatus (generating stations)			
Steam machinery and apparatus (generating stations)			
Gas machinery and apparatus (generating stations)			
Electrical apparatus (generating stations)			
Sub-station apparatus			
Transmission lines			
Construction, poles and lines			
Construction, subways and cables			
Services			
Line transformers			
Meters			
Arc lamps			
Incandescent lamps			
Motors			
Fixtures and merchandise			
Tools and implements			
Testing apparatus			
Stable equipment			
Steam heating plant, fixtures and appliances			
Office furniture and fixtures			
Miscellaneous (specify)			

Total

SIGNATURES AND CERTIFICATE TO REPORT.

We hereby certify that the statements contained in the form of our report are full, just and true.

..... Mayor.
 Clerk.
 Treasurer.
 Superintendent of Works.

Dated at
 this day of A. D.

ANNUAL REPORT TO THE ONTARIO RAILWAY AND MUNICIPAL BOARD, PUBLIC UTILITIES BRANCH.

WATER WORKS SECTION.

From the Municipality of the of , for the year ending December 31, 190 . Printed by Order of the Legislative Assembly of Ontario.

PARLIAMENT BUILDINGS,
 TORONTO, ONT., Dec. 31, 190

To the Municipality of.....

Blank forms for annual reports of Municipalities operating public utilities as required by the *Ontario Railway and Municipal Board Act*, are herewith transmitted. The value of these reports, not only to the Legislature but to the citizens of the respective Municipalities and the public generally, depends on their accuracy and completeness. Special attention should therefore be taken to make the reports as full and as exact as possible, so that comparisons, averages and all deductions based thereon may be reliable. Uniformity in detail is especially desirable and it is essential that no changes should be made in the blank form.

The Board will be greatly obliged if the reports are completed and returned as soon as possible. The Statute requires that the annual report should be transmitted on or before.....date.

PUBLIC UTILITIES—WATER WORKS.

The following Questions to be answered by Municipalities.

1. When was plant installed?	
1a. At what times and at what cost were material additions made to the water works?	
2. Is the water subjected to a purification process?	
3. Explain by what means, furnishing the following information: kind of filter, mechanical or sand, and by whom installed or designed?	
If a sand filter, furnish plans showing the sand bed, their arrangement, size and number; the depth of sand, the depth of water on the sand, the capacity of each bed in gallons per acre per day, details of sedimentation or settling basin of clear water reservoir, of drainage system; whether chemicals are used, aeration furnished; size of inlet and outlet pipes; method of regulating the head on the filters; periods of service between cleanings, etc.	
If mechanical filters are used, furnish similar information.	

Questions to be Answered by Municipalities.—Continued.

4. What kind of sand is used in the filters, where is it obtained, and what is its size and uniformity coefficient?	
5. Is the purification plant at present installed the same as the original plant? If not, state at what times and at what cost material changes were made and for what reason?	
6. Give the cost of the purification treatment per million gallons of water treated. Furnish separate figures for labor, chemicals, interest charges, laboratory, etc.	
7. Are tests made of the purity of the water? (a) Physical? (b) Chemical? (c) Bacteriological? In what way, how often and by whom are the tests made? Furnish the general results of such tests for the last calendar year?	
8. What is the cost of the laboratory per million gallons of water used?	
9. Are complaints received concerning the turbidity, odor, etc., of the water?	
10. At what periods of the year are such complaints most frequently received?	
11. What other sources of supply are used in addition to the public supply? Furnish as specific information as possible, indicating the number of wells, etc.	
12. What is the extent of the drainage area from which the supply is obtained?	
13. How is the sanitary condition of the watershed ascertained and controlled?	
14. What is the annual expenditure for examining and controlling the purity of the water supply? Itemize the account in a general way.	
15. What portion of the watershed is owned by the municipality or corporation?	
16. What inspection of the plumbing and distributing system is maintained? Give the number of men employed, their rank and the annual cost.	
17. Are rain gauge records kept at various points in the watershed? Furnish the annual record for the past 10 years.	
18. Are gaugings taken of the stream from which the water supply is obtained? Furnish a condensed statement of the annual yield of the stream for the past 10 years.	
19. Does any other municipality obtain water from the same watershed above the intake? If so, specify.	
20. What pollution exists above the intake point from which the supply is obtained?	
21. What is the average daily yield, taken for one year, of the watershed?	

Questions to be Answered by Municipalities.—Continued.

- | | |
|--|--|
| 22. Has the source of supply ever failed? Give the dates and periods of time. | |
| 23. What population is included within the municipality? | |
| 24. How many persons are now supplied from the public supply, and how many from other sources? | |
| 25. What is the average daily consumption per inhabitant? | |
| 26. State the consumption in gallons per day per inhabitant.
(a) Used for domestic purposes.
(b) Used for commercial and industrial purposes.
(c) Used for public purposes.
(d) Wasted. | |
| 27. Furnish the following information:
(a) The number of houses within the municipality.
(b) The total number and sizes of service taps in use.
(c) The number of bath tubs.
(d) The number of water closets.
(e) The number of wash tubs, sinks and basins.
(f) The total number of faucets.
(g) The total number of meters in use.
(h) The total number and sizes of hydrants. | |
| 28. Are the meter charges graded according to the consumption? Furnish the meter rates and also all other water rates. | |
| 29. Is the water system a gravity or pumping system? | |
| 30. How much water is pumped per annum? Furnish the figures for the past five years. | |
| 31. What is the average static head against which the pumps work? | |
| 32. What is the average dynamic head against which the pumps work? | |
| 33. What are the ranges of pressures in the mine? | |
| 34. Give the sizes and lengths of pipe in use. | |
| 35. If there are any dead ends, state how many and how often they are cleaned. | |
| 36. What is the cost of the repairs per mile of pipe per year? | |
| 37. Give the duty of the pumps in foot pounds per 100 pounds of coal burned, making no deductions. | |
| 38. Give the cost per million gallons raised one foot high figured on pumping station expenses. | |
| 39. Give the cost per million gallons raised one foot high figured on fixed charges, and operating and maintaining expenses. | |
| 40. Give cost of producing 1,000 gallons water, including interest on debentures. | |
| 41. Give the cost of the entire water works to date. | |

QUANTITY OF WATER CONSUMED DURING YEAR.

Meter Service, Galls.	Contract Service.	Total.	By Municipalities.	Total Gallons.
-----------------------	-------------------	--------	--------------------	----------------

PUBLIC UTILITIES—WATER WORKS OPERATING EXPENSES.

Salaries of officers, superintendents, clerks				
Office supplies and expenses				
Insurance				
Legal expenses and damages				
Other expenses				
Wages				
Supplies:				
Fuel				
Pumping station supplies				
Filtration supplies				
Other supplies				
Total supplies				
Actual disbursements				
For repairs and renewals				
Interest on bonds or loans				
Total cost of production				

PUBLIC UTILITIES—WATER WORKS.

Form

PLANT.					KIND OF DISTRIBUTION.					
Reservoirs			Tanks		Stand Pipes			Direct Pumping		Source of Supply
No. in Use.	Hd. of Water, Ft.	Total Storage, Capacity, Gals.	Dimensions		No. in Use.	Hd. of Water, Ft.	Dimensions	Pressure	Total Capacity Galls. Daily.	
			Diam-eter, Ft.	Ht., Ft.							Ordin-ary Ser-vice, lbs.	Fire Ser-vice, lbs.

WATER WORKS.

Questions to be Answered by Municipalities.

INVESTMENT.

Cost of land		
Construction for storage		
At source of supply		
Cost of wells		
Cost of conduits		
Cost of buildings		
Cost of pumping equipment		
Cost of distributing reservoirs and tanks.....		
Cost of filters and filtration beds		
Cost of mains		
Cost of meters and hydrants		
Cost of other items (in bulk)		
Total amount invested in water works plant		

SINKING FUND.

The following Questions to be Answered by Municipalities only.

DR.	\$	\$
To balance Dec. 31, 190 .....	.....	.....
To amount from appropriation dated .....	.....	.....
To income during the year from amount invested .....	.....	.....
CR.	\$	\$
By bonds cancelled .....	.....	.....
By other items (giving particulars), .....	.....	.....
By balance to new account. ....	.....	.....
How is fund invested?		

PUBLIC UTILITIES.

Signatures and Certificate to Report.

We hereby certify that the statements contained in the form of our report are
full, just and true.

.....

Mayor.

.....

Clerk.

.....

Treasurer.

.....

Superintendent.

Dated at
this.....day of.....A. D.

ANNUAL REPORT TO THE ONTARIO RAILWAY AND MUNICIPAL
BOARD, PUBLIC UTILITIES BRANCH.

TELEPHONE SECTION.

From the Municipality of the of , for the year ending December
31, 190 . Printed by Order of the Legislative Assembly of Ontario.

PARLIAMENT BUILDINGS,

TORONTO, ONT., Dec. 31, 190

To the Municipality of.....

Blank forms for annual reports of Municipalities operating public utilities as required by the *Ontario Railway and Municipal Board Act*, are herewith transmitted. The value of these reports, not only to the Legislature but to the citizens of the respective Municipalities and the public generally, depends on their accuracy and completeness. Special attention should therefore be taken to make the reports as full and as exact as possible, so that comparisons, averages and all deductions based thereon may be reliable. Uniformity in detail is especially desirable and it is essential that no changes should be made in the blank form.

The Board will be greatly obliged if the reports are completed and returned as soon as possible. The Statute requires that the annual report should be transmitted on or before.....date.

PUBLIC UTILITIES—TELEPHONES.

The following Questions to be Answered by the Municipalities.

1. Give date when system was installed
2. Give rates of service:
 - (a) Local connections
 - (b) Interurban connections
 - (c) Long distance connections
 - (d) Rate at public stations
 - (e) Rate at public stations to subscribers
3. Is any entrance fee charged?
4. Give number of persons to each telephone
5. Give number of messages during the year
6. Give number of offices
7. Give number of miles of wire owned:
 - (a) On poles
 - (b) On buildings
 - (c) Underground
 - (d) Submarine
8. Give number of circuits
9. Give number of employees
10. Give total number of subscribers
11. Give number of miles of poles and cables operated not owned
12. Give number of miles of poles and cables operated and owned
13. Give number of daily messages
14. Give amount of average wages paid:
 - (a) To linemen
 - (b) To operators
 - (c) To other employees

PUBLIC UTILITIES—TELEPHONES.

For Year ending December 31, 190 .

Results of operation :				
Income				
Gross income from local service				
Gross income from long distance				
Dividends and interest on investments				
Total revenue				
Expenses of operation :				
Wages and general expenses				
Maintenance of cables, poles, etc.				
Interest and taxes				
Miscellaneous expenses				
Total expenses				
Gain in operation				

PUBLIC UTILITIES—TELEPHONES.

	<i>Assets.</i>			
Telephones				
Real estate				
Stocks				
Merchandise and machinery				
Bills and assets				
Cash and deposits				
Total assets				
	<i>Liabilities.</i>			
Debentures current				
Bank overdraft				
Unpaid accounts				
Surplus				

SINKING FUND.

The following Questions to be Answered by Municipalities.

DR.				
To balance June 30, 190	\$.		\$.	
To amount from appropriation dated,				
To income during the year from amount invested				
CR.				
By bonds cancelled,	\$.		\$.	
By other items (giving particulars),				
By balance to new account Dec. 31, 190.				
How is fund invested?				

PUBLIC UTILITIES.

Signatures and Certificate to Report.

We hereby certify that the statements contained in the form of our report are full, correct and true.

..... Mayor.
..... Clerk.
..... Treasurer.
..... Superintendent of Works.

Dated at
this.....day of.....A. D.....

ANNUAL REPORT TO THE ONTARIO RAILWAY AND MUNICIPAL BOARD, PUBLIC UTILITIES BRANCH.

GAS WORKS SECTION.

From the Municipality of of , for the year ending December 31, 190 . Printed by Order of the Legislative Assembly of Ontario.

PARLIAMENT BUILDINGS,
TORONTO, ONT., Dec. 31, 190

To the Municipality of.....

Blank forms for annual reports of Municipalities operating public utilities as required by the *Ontario Railway and Municipal Board Act*, are herewith transmitted. The value of these reports, not only to the Legislature but to the citizens of the respective Municipalities and the public generally, depends on their accuracy and completeness. Special attention should therefore be taken to make the reports as full and as exact as possible, so that comparisons, averages and all deductions based thereon may be reliable. Uniformity in detail is especially desirable and it is essential that no changes should be made in the blank form.

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GAS WORKS SECTION.

The following Questions to be Answered by Municipalities.

1. Name of municipality
2. Territory in which operations are carried on?
3. Population of municipality supplied with gas
4. Date of vote to establish plant
5. Did municipality acquire a private plant in use or install a new and independent plant
6. Total assessed valuation of real estate in municipality
7. Bonded indebtedness. (In respect of gas plant)
Authorized \$..... Issued \$.....
8. Rate of interest paid on bonds or debentures
9. Amount invested in plant, \$.....
10. Reference to any special Acts relating to operation of plant

General Information—Gas Works Section—Continued.

Number of street gas lamps supplied at close of year (kind)	
Price per lamp, per annum	
Estimated consumption of lamps for street lighting, per annum	
.....	
Number of hours lighted during the year	
Number gas arcs in use for street lighting	
Number of gas arcs in use for commercial lighting	
Are service pipes laid free from main to cellar? If not, state for what portion of pipe a charge is made	
.....	
Number of stoves leased by the municipality	
Estimated number of stoves in use in district supplied	
Number of gas engines leased by the municipality	
Number of gas engines in use in district supplied	
Total horse power of engines supplied	
Total capacity of plants	{ Coal gas
	{ Water gas
	{ Acetylene gas
	{ Gasoline gas
	From whom purchased. Amount purchased.
Gas purchased during year ..	{ cu. ft.
	{ cu. ft.
	{ cu. ft.
	{ cu. ft.
	{ cu. ft.
	{ cu. ft.
	{ cu. ft.
	{ cu. ft.
Cu. ft. of gas on hand Dec. 31, 190 ..	{ Coal gas
	{ Water gas
	{ Acetylene gas
	{ Gasoline
Cu. ft. of gas produced during year	{ Coal gas
	{ Water gas
	{ Acetylene gas
	{ Gasoline gas
	{ Natural gas
Cu. ft. of gas bought during year	{ Coal gas
	{ Water gas
	{ Acetylene gas
	{ Gasoline gas
	{ Natural gas
	Total
Number of feet sold by meter during year to general consumers.....	
Number of feet sold to other companies	
Number of feet supplied to street lamps during year	
Number of feet supplied to public buildings during year	
Number of feet used by company at works, offices, etc.	
Number of feet on hand December 31, 190	
Number of feet of natural gas sold by meter	
Number of feet of natural gas sold not metered	
.....	
Total	
Number of feet unaccounted for during the year	
Per cent. unaccounted for	
Maximum output in twenty-four hours, date	
Minimum output in twenty-four hours, date	
.....	
Give sizes of street mains in use and length of each size	

General Information—Gas Works Section—Continued.

Service pipes, number in use 31st December, 190	
Service pipes, number removed during year 190	
Service pipes, number added during year 190	
Give number meters in use 31st December, 190	
Give number meters removed during year 190	
Give number meters of each size in use 31st December, 190	
Give candle power of gas supplied to consumers	
How is candle power determined?	
How often is it tested?	
Is gas analyzed regularly?	
Gross price per thousand cubic feet December 31, 190 (lighting)	
Gross price per thousand cubic feet December 31, 190 (fuel)	
Give schedule of cash or other discounts allowed for lighting and fuel and statement of minimum charges, if any	
Is special rate made for power purposes?	
What changes have been made in price or discount for lighting or fuel during the year and when made	
Cubic feet of gas sold per capita	Cubic feet of gas sold per meter
Cubic feet of gas sold per consumer	
Cubic feet of gas sold per mile of main	

GROSS EARNINGS FROM OPERATION—GAS WORKS SECTION.

The following Questions to be Answered by Municipalities.

FROM SALE OF GAS.

To general consumers (ordinary meters):			
For lighting.....cu. ft. at.....per M \$.....\$.....			
For cooking and heating....." "....." ".....			
For power....." "....." ".....			
Less discounts and allowances.....		\$.....	\$.....
Net from ordinary meters.....		\$.....	\$.....
To general consumers (prepayment meters):			
.....cu. ft. at.....per M.....			
To public buildings:			
.....cu. ft. at.....per M.....			
For street lighting:			
.....cu. ft. estimated at			
To other companies:			
.....cu. ft. at.....per M.....			
....." "....." ".....			
....." "....." ".....			
....." "....." ".....			
Gas used at works, offices, etc.:			
....." ".....per M.....			
Total from sales of gas.....		\$.....	\$.....

GROSS EARNINGS FROM OPERATION—GAS WORKS SECTION.—Continued

Questions to be Answered by Municipalities.—Continued.

RESIDUAL PRODUCTS:			
Coke used (gas).....	\$.....	\$.....	
Coke used (electric).....			
Coke sold to others.....			
Tar (coal gas).....			
Tar (water gas).....			
Other residuals (specify).....			
		\$.....	\$.....
FROM OTHER SOURCES:			
Rent of meters.....	\$.....	\$.....	
Rent of gas stoves and engines			
Rent of gas lamps			
Miscellaneous (specifying)			
Gross earnings from operation		\$.....	\$.....

OPERATING EXPENSES—GAS WORKS SECTION.

The following Questions to be Answered by Municipalities.

Manufacture:				
Salaries, manufacture				
Labor, manufacture				
Labor, purification				
Gas coal				
Enricher (coal gas)				
Bench fuel				
Generator fuel				
Oil (water gas)				
Boiler fuel				
Water				
Purification materials				
Residual expense				
Works expense				
Materials (gasoline gas)				
Materials (acetylene gas)				
Repairs, works (coal gas)				
Repairs, works (water gas)				
Repairs, works (general)				
Gas purchased				
Distribution:				
Distribution, salaries				
Complaints and gratuitous work				
Setting and removing meters and regulators				
Operating and repairing street lamps				
Gas stoves and appliances				
Jobbing				
Repairs, mains				
Repairs, services				
Repairs, meters				
*Operating wells				
*Operating lines				
*Repairs, wells				
*Repairs, lines				
*Repairs, building and apparatus				

*In case natural gas is furnished.

OPERATING EXPENSES—GAS WORKS SECTION.—Continued.

Questions to be Answered by Municipalities—Continued.

General expense:				
Salaries of officers				
Office salaries				
Office expense				
Registering and collecting				
+Legal expense				
General expense				
Advertising				
Canvassing				
Uncollectable accounts				
Taxes				
Insurance				
Franchises				
Leaseholds, rentals, etc.				
Damages, including legal expense connected therewith				
Depreciation (in addition to actual expenditure for repairs, renewals and replacements).....				
Total				

+Not to include legal expenses connected with damages.

INCOME ACCOUNT—GAS WORKS.

Gross earnings, Gas				
Operating expenses, Gas				
Net earnings from operation				
MISCELLANEOUS INCOME				
Income from securities owned, less taxes.....				
Rent				
Other miscellaneous income (specify)				
.....				
Gross income, less operating expenses				
Deductions from income:				
Interest on funded debt.....				
Interest on floating debt.....				
Other deductions from income (specify)				
.....				
Total net income.....				
DEDUCTIONS FROM NET INCOME				
Sinking fund				
Reconstruction reserve fund				
Other funds (specify)				
Surplus (or deficit) for year.....				

*If net loss or deficit, insert figures in red ink.

GAS WORKS SECTION.
Sinking Fund.

Dr.			
To balance Dec. 31, 190.....	\$.....	\$.....	
To amount from appropriation dated .....	.....	.....
To income during the year from amount invested.....	.....	.....
		\$.....	
Cr.			
By bonds cancelled.....	\$.....	\$.....	
By other items (giving particulars).....	.....	.....
.....	
By balance to new account Dec. 31, 190.....	.....	.....
		\$.....	

How is fund invested?

CONSTRUCTION AND EQUIPMENT—GAS WORKS.

The following Questions to be Answered by Municipalities.

	Debits during year.	Credits during year.	Amount to Dec. 31, 190
Organization
Franchises
Land occupied by plant
Buildings
Machinery and apparatus
Other real estate
Street mains
Services
Meters
Street lamps and fixtures
Tools and appliances
Testing apparatus
Gas stoves and appliances
Stable equipment
*Wells, derricks and appliances
*Rights of way
*Mineral and gas rights
*Leaseholds
*Pipe lines (main)
*Pipe lines (field)
Office furniture and fixtures
Miscellaneous (specify)
Total

Amount invested per mile of main
*In case natural gas is furnished.

SIGNATURES AND CERTIFICATE TO REPORT.

We hereby certify that the statements contained in the form of our report are full, just and true.

.....	Mayor.
.....	Clerk.
.....	Treasurer.
.....	Superintendent of Works.

ted at
this day of A. D. 190.....

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